

Lake Mead National Recreation Area



Environmental Assessment for the Las Vegas Bay Marina Emergency Relocation



SECTION I: PURPOSE OF AND NEED FOR ACTION

Introduction

The National Park Service is considering alternatives for the temporary emergency relocation of Las Vegas Boat Harbor, Inc (Las Vegas Bay Marina) at Lake Mead National Recreation Area (NRA).

The environmental assessment (EA) evaluates the no action alternative and three action alternatives. The alternatives analyzed are: Alternative A: No Action; Alternative B: Relocate to Horsepower Cove; Alternative C: Relocate to Hemenway Point; and, Alternative D: Close Marina and Government Buy Out of Operations. The alternative site locations were developed based on availability of utilities, access to the site, amount of available space on the land and on the water, level of land-based construction that would be necessary to accommodate the marina, water levels and underwater gradients. This document also includes discussions of alternatives that have been ruled out and justifications for their elimination.

Purpose and Need

Marina operations, public safety, and recreational services are currently being threatened by the rapid movement of an expansive delta front generated from erosion in the Las Vegas Wash. Increasing flows in Las Vegas Wash have contributed to higher sediment flows being discharged into Las Vegas Bay. Over the past 30 years erosion in the wash has deposited 4.5 million cubic yards of material in the delta. The dropping water elevations have exposed approximately one mile of delta sediments and, along with daily wash flows, and are contributing to the rapid spread of the delta. Consultants and area scientists agree with the National Park Service and marina operators that there is an imminent threat to marina operations and visitor services from the rapidly advancing sedimentation delta, and low water conditions. If a flash flood occurs, the marina or portions of the marina would be covered by the delta. Flash flood season occurs from July through September. Based on recent delta movement patterns, it is estimated that the marina must vacate its current position in Las Vegas Bay within 90 to 120 days, provided there are no flash floods during that period.

The normal ability to chase the water line is limited by the existing and projected low water conditions, rapidly advancing sedimentation delta, underwater and shoreline topography, and the availability of necessary infrastructure.

The exposed delta is rapidly moving towards the Las Vegas Bay operations and threatening public safety and the recreational services in the Bay (Photos 1 and 2).

Background

Las Vegas Wash drains the Las Vegas Valley, which has a total drainage area of about 5,700 square km and includes the entire metropolitan area of Las Vegas. The drainage



Photo 1. Delta at Las Vegas Bay



Photo 2. Delta encroaching towards Las Vegas Bay Marina

area has extensive vertical relief. The maximum elevation is nearly 3,660 m in the mountains west of Las Vegas and the minimum elevation is about 366 m where the Wash enters Lake Mead. All elevations given in this report are referenced to the North American Vertical Datum of 1988, also known as NAVD 88, unless otherwise noted.

Before the urbanization of the Las Vegas Valley, the Wash was an ephemeral stream, flowing only during significant rainfall events. Rapid population growth in the Valley began in the 1930s with the construction of Hoover Dam, continued in the 1940s with wartime military activity, and has continued to the present day due to growth in the gaming and entertainment industries. Urban development has been accompanied by an increase in wastewater discharges. By 1955, Las Vegas Wash had become a perennial stream (Glancy 1999). Today, the average base flow due to wastewater discharge is about 230 cubic feet per second (150 million gallons per day).

By 1969, floodplain erosion was visible at two sites in the Wash (Glancy 1999). The upstream erosion site was at the confluence with the Three-Kids Wash tributary. The downstream erosion site was on the downstream side of Northshore Road. The road crossing consisted of a box culvert in 1969.

The channel below Northshore Road continued to degrade considerably, and a deep headcut developed at the downstream face of the Northshore Road culvert. In 1978 the culvert was removed and replaced by a bridge. The headcut that had been positioned downstream of the road progressed upstream.

The summer of 1984 produced multiple flash floods in the Wash. These floods caused roughly 7.6 m of floodplain degradation in the vicinity of the bridge. It has been estimated that from 1960 through 1984, about 3.4 million cubic meters of sediment were eroded from the Wash and deposited in Lake Mead.

Construction of the Lake Las Vegas dam began in 1989 and was completed in the early 1990s. Low flows in the Wash bypass the reservoir completely through a bypass conduit constructed of dual 2.13-meter (84-inch) diameter reinforced concrete pipes. Flood flows exceeding the capacity of the bypass enter the reservoir. When necessary, the flood flows are released to the downstream reach through a combination of spillways.

Large floods occurred in July and September of 1998 and again in July of 1999. The 1999 flood is the flood of record, with an estimated peak discharge rate of 481.4 cubic meters per second just upstream of Lake Las Vegas (Sutko 1999). Prior to that flood, the September 1998 flood had been the flood of record, with a peak discharge rate of about 270.7 cubic meters per second (Sutko 1998).

The Las Vegas Wash currently serves as the outflow for the entire Las Vegas Valley watershed, including storm water, shallow groundwater, urban runoff, and a daily discharge of 150 million gallons per day of treated effluent. Current flows reach 227 cubic feet per second. The channel is extremely unstable and head cutting is severe. Erosion prevention structures have been placed at several locations along the Las Vegas

Wash, including within Lake Mead NRA at Northshore Bridge. More structures upstream from the recreation area are planned for the future.

Increasing flows in Las Vegas Wash have contributed to higher sediment flows being discharged into Las Vegas Bay. Over the past 30 years erosion in the wash has deposited 4.5 million cubic yards of material in the delta. This exposed material is rapidly moving towards the Las Vegas Bay operations and threatening public safety and the recreational services in the Bay.

PROJECT AREA LOCATION

Lake Mead NRA is located in southeastern Nevada and northwestern Arizona (Figure 1). Las Vegas Bay Marina is located at mile 10 on Lakeshore Road, near the intersection of Lakeshore Road and Northshore Road (Figure 2). The overall project area is located in the Boulder Basin development zone as designated in the Lake Mead NRA *General Management Plan*, 1986 (Figure 3).

ENVIRONMENTAL ASSESSMENT

This EA analyzes three action alternatives and the no-action alternative and their impacts on the human and natural environment. It outlines project alternatives, describes existing conditions in the project area, and analyzes the effects of each project alternative on the environment. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.9).

RELATED PLANNING DOCUMENTS, AND APPLICABLE LAWS AND LEGISLATION

The National Park Service Organic Act of 1916 directs the National Park Service to manage units “to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations.” Congress reiterated this mandate in the Redwood National Park Act of 1978 by stating that the National Park Service must conduct its action in a manner that will ensure no “derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.”

The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts “harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values.” (*Management Policies* 1.4.3).

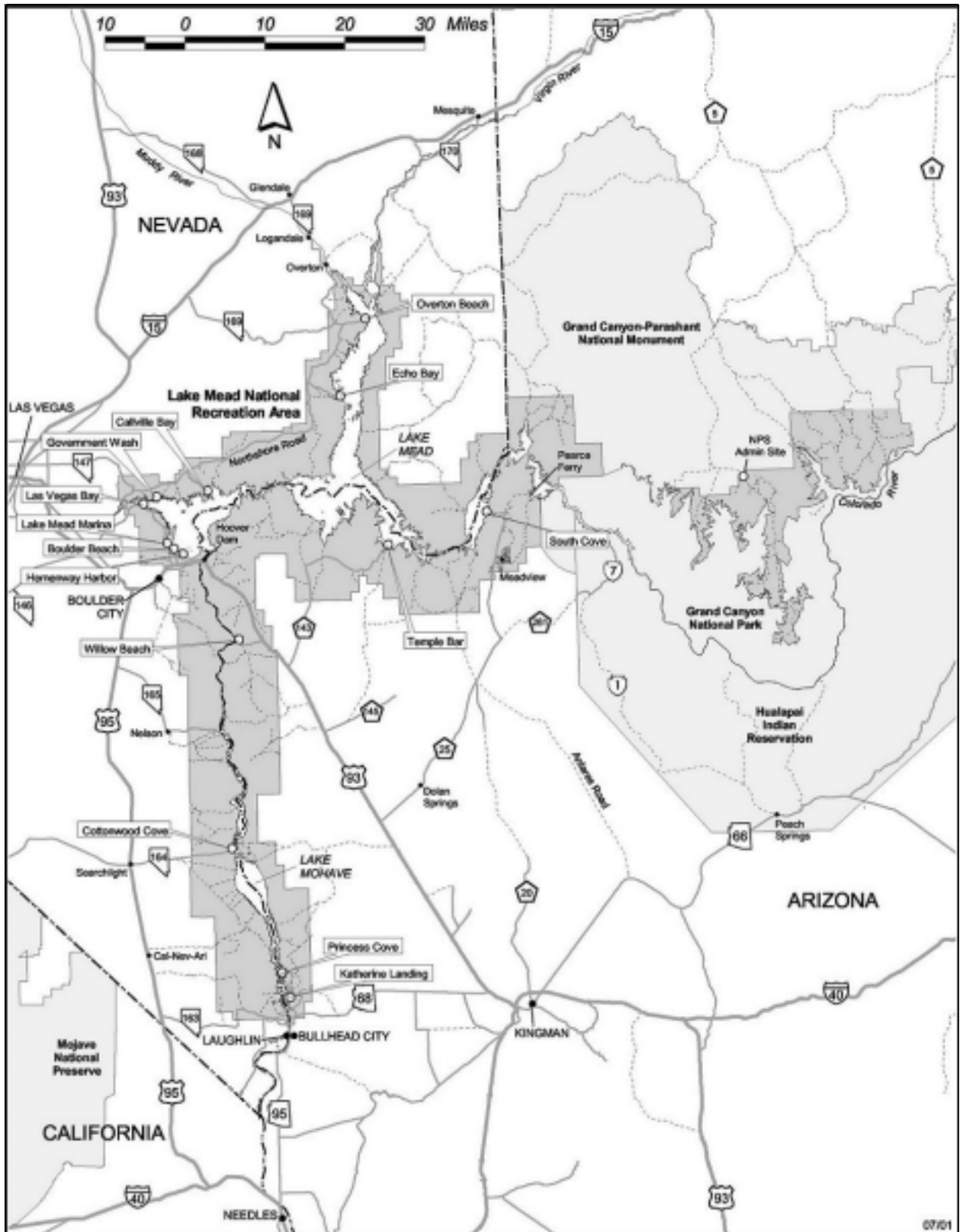


Figure 1. Area Map

Current Location Las Vegas Boat Harbor

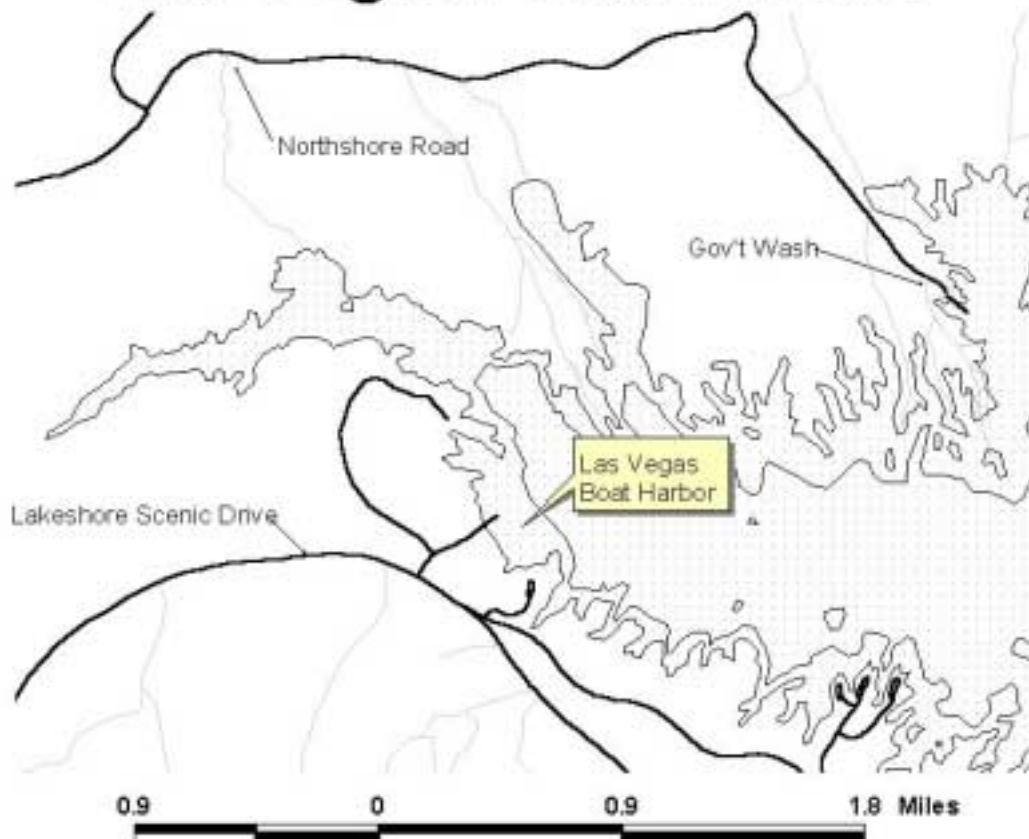


Figure 2
Current Location of Las Vegas Boat Harbor
Las Vegas Bay



Lake Mead National Recreation Area Alternative Relocation Sites

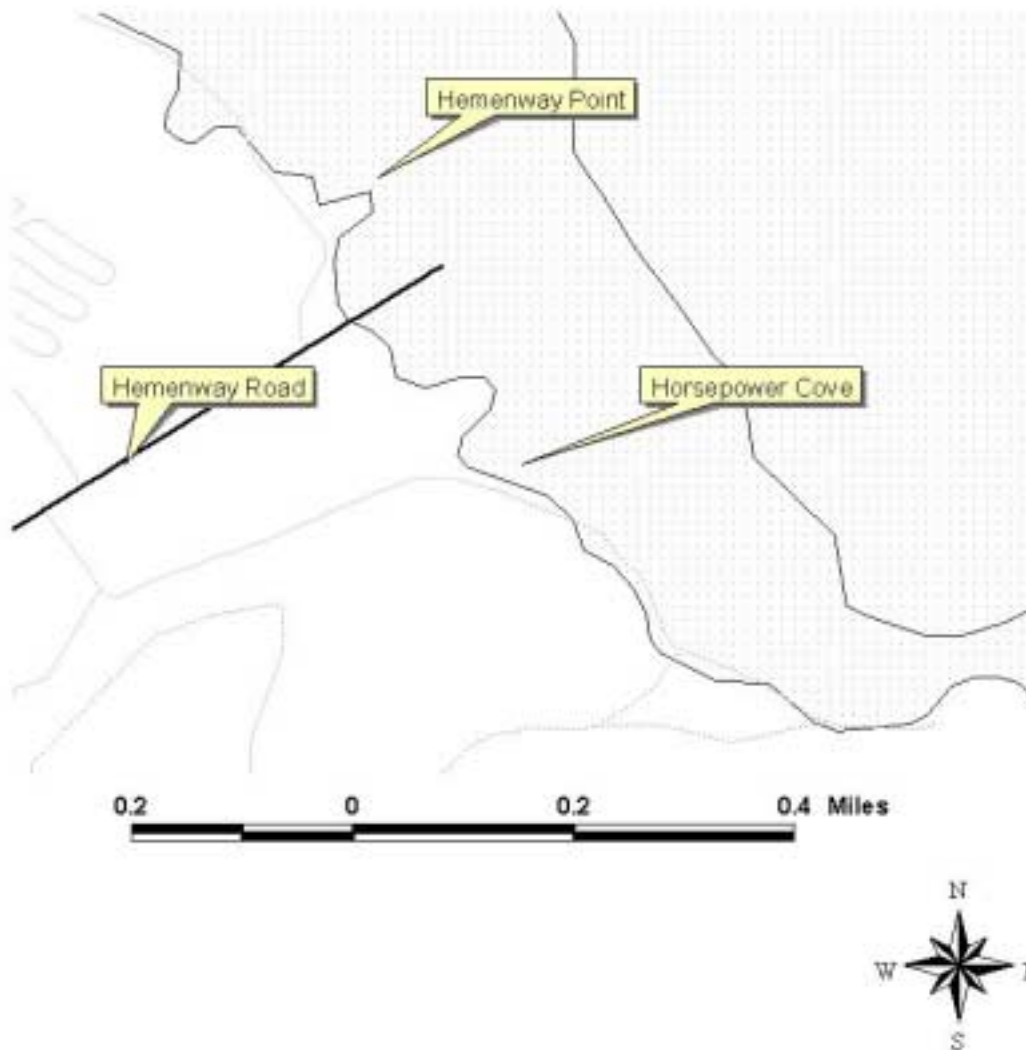


Figure 3
Lake Mead NRA
Clark County, Nevada
Map generated by ArcView at Lake Mead NRA

National Park Service *Management Policies*, 2001, requires the analysis of potential effects of each alternative to determine if actions would impair park resources. To determine impairment, the National Park Service must evaluate “the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.” (*Management Policies* 1.4.4). The National Park Service must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values (*Management Policies* 1.4.3).

Lake Mead National Recreation Area was established in 1964 (PL 88-639), “for the general purposes of public recreation, benefit, and use, and in a manner that will preserve, develop and enhance, so far as practicable, the recreation potential, and in a manner that will preserve the scenic, historic, scientific, and other important features of the area, consistent with applicable reservations and limitations relating to such area and with other authorized uses of the lands and properties within such area.”

National Park Service units vary based on their enabling legislation, natural and cultural resources, missions, and the recreational opportunities appropriate for each unit, or for areas within each unit. An action appropriate at Lake Mead NRA, as designated by the enabling legislation, may impair resources in another unit. This environmental assessment analyzes the context, duration, and intensity of impacts related to the alternatives associated with moving the Las Vegas Bay Marina, as well as the potential for resource impairment, as required by Director’s Order 12, *Conservation Planning, Environmental Impact Analysis and Decision Making*.

The 1986 *General Management Plan* provided the overall management direction for Lake Mead NRA. It established management zones to accommodate increasing visitor use while protecting park resources. However, many of the current issues were not anticipated and therefore not addressed in the *General Management Plan*.

The Lake Mead NRA *Lake Management Plan and draft Environmental Impact Statement* amended the information in the *General Management Plan* that related to visitor use and resource protection of Lakes Mead and Mohave. This plan addressed issues and alternatives related to existing facilities and potential facility expansion, carrying capacity, visitor use and recreational settings, personal water craft use, and resource protection. It did not address the issues resulting from the extreme low water that Lake Mead is currently experiencing, and the predicted low water elevations.

In December 2000, the Secretary of the Interior, acting through the Bureau of Reclamation, adopted interim criteria under which surplus water conditions may be declared in the lower Colorado River Basin during a 15-year period that would extend through 2015. Within the *Environmental Impact Statement for Surplus Water Criteria*, potential issues involving low water and the impacts to marina operations were analyzed.

However, this document did not foresee the current and predicted drought conditions, and did not fully analyze the effects of the drought on existing National Park Service and concessioner facilities.

The 1998 Lake Mead NRA Strategic Plan established goals relating to resource protection, public enjoyment, and visitor satisfaction. The 2001 Strategic Plan has reaffirmed these goals.

The National Park Service Concessions Management Improvement Act of 1998 (PL 105-391) established the legislation under which the National Park Service is to manage concession operations within units of the National Park System. This act requires the National Park Service to provide a reasonable opportunity for profit to authorized concession operations. This act also provides for protection of concessioner investment and states that, “A concessioner shall have a leasehold surrender interest in each capital improvement constructed by a concessioner under a concessions contract, consisting solely of a right to compensation for the capital improvement.” Leasehold surrender interest “shall not be extinguished by the expiration or other termination of a concessions contract and may not be taken for public use except on payment of just compensation.”

The concessions contract between the National Park Service and Las Vegas Boat Harbor, Inc., also recognizes that the establishment and maintenance of concessioner facilities and services “involve a substantial investment of capital and the assumption of the risk of operating loss, and it is therefore proper, in consideration of the obligations assumed hereunder and as an inducement to capital, that the concessioner be given assurance of security of such investment and of a reasonable opportunity to make a fair profit.” In addition, the concessions contract specifically states, “it is the intention of the parties that any acts, policies, or decisions of the Secretary under this contract will be consistent with reasonable protection to the Concessioner against loss of its investment and against substantial increase in costs, hazards, and difficulties of its operations.”

This environmental assessment analyzes the issues and alternatives related to the emergency situation at Las Vegas Bay. An amendment to the General Management Plan will be required to look at the long-term management of the facilities on Lake Mead due to the predicted future low water levels. This amendment will be prepared in the next year to determine which marina operations will be affected by low water and what options are available for those facilities.

ISSUES AND IMPACT TOPICS

Issues are related to potential environmental effects of project alternatives and were identified by the project interdisciplinary team. Public scoping occurred to assist in the formulation of issues. Once issues were identified, they were used to help formulate the alternatives and mitigation measures. Impact topics based on substantive issues, environmental statutes, regulations, and executive orders (EOs) were selected for detailed analysis. A summary of the impact topics and rationale for their inclusion or dismissal is given below.

Issues and Impact Topics Identified for Further Analysis

The following relevant impact topics are analyzed in the EA. Whether each issue is related to taking action or no action is specified.

All of the proposed locations for the marina facilities are in previously disturbed areas within the Boulder Basin development zone, as designated within the Lake Mead NRA General Management Plan (1986). The marina would not change the lake capacities designated by the preferred alternative of the Lake Mead NRA Lake Management Plan and draft EIS (2002). It would change or modify locations of the proposed shoreline zoning in the Boulder Basin area.

The primary issues associated with moving the marina include:

- **Soils and Vegetation.** Soils and vegetation could be disturbed during the land-based preparation for the marina relocation if areas outside the previously disturbed areas are utilized.
- **Wildlife and Aquatic Life.** Wildlife could be temporarily disturbed by the land-based preparation for the marina relocation. Aquatic life near the alternative locations could be disturbed and displaced by the marina relocation.
- **Threatened and Endangered Species/Critical Habitat Designation of Lake Mead.** Removing the marina from Las Vegas Bay could protect known habitat of the razorback sucker. Potential habitat for the desert tortoise is located adjacent to the alternative project locations.
- **Upgrading and extending utilities.** Right-of-Way upgrades and permitting would be required for the utilities related to the marina re-location and there could be new disturbance associated with trenching for utility corridors.
- **Water Resources and water quality at new marina location.** If the marina is relocated, there could be impacts to the new location from marina operations
- **Floodplains/drainages.** Marina facilities and land-based activities would be located adjacent to Lake Mead under the high water elevation of the reservoir.
- **Air quality.** Air quality could be impacted temporarily by land-based construction activities. Dust from the use of dirt roads and parking areas could impact the air quality. Oil and gas fumes would be present at the marina location.
- **Visual Resources.** The marina operations would be located within the developed area where facilities are currently operated and where visitors expect facilities.
- **Recreation resources.** Certain recreational users would be displaced by the relocation of the marina.
- **Visitor experience and public safety.** Visitors who currently rent slips at Las Vegas Bay Marina would be forced to travel to a new location to access their boats. The nature of the type of visitors using Las Vegas Bay Marina may change as many of the current visitors to Las Vegas Bay enjoy the area for its fishing and because it is located close to Henderson, Nevada. Some of these visitors may choose to not follow the concessioner to a new location.

- Cumulative effects of Low Water on Lake Mead developed areas. Predicted lake elevations could create future risks and problems for other marina operations on Lake Mead.
- Socioeconomic Resources. Removing the Las Vegas Bay Marina from its present location and relocating it to another location in Boulder Basin would cost the concessioner, and reduce its profit margin. Slip renters may chose not to move their vessels to the new location. Marina operations at Lake Mead marina could be impacted by competition from Las Vegas Bay Marina operations if they are moved nearby.
- Park Operations. Maintenance and upgrades of the existing roads, parking areas, facilities, and utilities would be required to relocate the marina which could take funding, personnel, and equipment away from other park operations.
- Potential for cultural resources in or near project area. Underwater cultural resources are present in Lake Mead, and should be considered when selecting a marina location. Future predicted water levels and the continual relocation of the marina would be considered for the potential effect on cultural resources.

Impact Topics Considered but Dismissed from Further Consideration

The following topics are not further addressed in this document because there are no potential effects to these resources, which are not in or adjacent to the project area:

- Designated ecologically significant or critical areas;
- Wild or scenic rivers;
- Wetlands;
- Designated coastal zones;
- Indian Trust Resources;
- Prime and unique agricultural lands;
- Sites on the US Department of the Interior's National Registry of Natural Landmarks;
- Sole or principal drinking water aquifers.
- Designated or Proposed Wilderness Areas

In addition, there are no potential conflicts between the project and land use plans, policies, or controls (including state, local, or Native American) for the project area. There are no sensitive noise receptors in the project area, other than Lake Mead NRA. The dominant noise source in the project area is automobile and truck traffic on Lakeshore and Hemenway Harbor Road, air traffic noise from air tours, boat noise from boats launching at Hemenway launch ramp, and boat traffic on the Boulder Basin. Since the proposed relocation sites are located in a developed area, where noise occurs regularly and is expected, and the site is zoned appropriate for mechanical noise, soundscape will not be further evaluated.

Regarding energy requirements and conservation potential, construction activities would require the increased use of energy for the construction itself and for transporting materials. However, overall, the energy from petroleum products required to implement

action alternatives would be insubstantial when viewed in light of production costs and the effect of the national and worldwide petroleum reserves.

There are no potential effects to local or regional employment, occupation, income changes, or tax base as a result of this project. The project area of effect is not populated and, per EO 12898 on Environmental Justice, there are no potential effects on minorities, Native Americans, women, or the civil liberties (associated with age, race, creed, color, national origin, or sex) of any American citizen. No disproportionate high or adverse effects to minority populations or low-income populations are expected to occur as a result of implementing any alternative.

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Table 1. Comparison of Alternatives

| Alternative A | Alternative B | Alternative C | Alternative D |
|--|---|---|--|
| No Action | Relocation of Marina to Horsepower Cove | Relocation of Marina to Hemenway Point | Buy-out of Marina |
| No relocation of marina. Marina would continue to follow water levels as much as possible. High potential that marina services would be suspended due to delta and low lake elevations. | Short-term relocation to address immediate need of moving marina out of harm's way. Basic services would be provided. Interim relocation including the installation of minor facilities based on NPS funding. | Short-term relocation to address immediate need of moving marina out of harm's way. Basic services would be provided. Interim relocation including the installation of minor facilities based on NPS funding. | Closure of facility and National Park Service buy-out to concession operators. Potential reallocation of slips and services to other marinas. |

SECTION II: DESCRIPTION OF ALTERNATIVES

Introduction

This section describes the alternatives considered, including the No Action Alternative. The alternatives described include mitigation measures and monitoring activities proposed to minimize or avoid environmental impacts. This section also includes a description of alternatives considered early in the process but later eliminated from further study; reasons for their dismissal are provided. The section concludes with a comparison of the alternatives considered.

Alternative A- No Action

Under this alternative, the marina would not be relocated and would remain in Las Vegas Bay. The concessioner would continue to operate under existing conditions, moving the marina further out into the harbor as the lake level recedes. When the lake level increases, the marina could not return to its previous location due to the delta, and would remain in a location outside of the encroaching delta.

Currently, concessioners that operate facilities on Lake Mead are incurring costs associated with the lowering lake levels. Under this alternative, these costs would continue to be incurred by the marina operators at Las Vegas Bay Marina. Costs to make adjustments to major facility at year 2000 price levels ranged from \$560,000 to \$970,000. Additional costs are incurred for any 20-foot drop below the 1,180-foot level, ranging from \$480,000 to \$800,000 per 20-foot drop.

Actions Common to Alternatives B and C

The following two alternatives, B and C, discuss two different locations in Hemenway Harbor that are being evaluated and considered for the relocation of Las Vegas Bay Marina. Both locations are being considered on a short-term and an interim basis. A long-term evaluation of the proposed relocation will be completed at a future date through an amendment to the Lake Mead NRA *General Management Plan* and will not be considered in this EA. Both alternatives would include the relocation of a 630-slip marina, and a small boat rental fleet.

For both alternatives, the short-term relocation addresses the immediate need of moving the marina out of harm's way. Under this scenario, the National Park Service and concessioner would work together to provide road access, parking (approximately 300 spaces), mobile restrooms, and signage. The existing asphalt road base, which is in poor condition, would be removed and the road would be graded. All land facilities would remain within the existing road corridor and parking area. Permanent commitment of resources, removal of vegetation and new ground disturbance would not be authorized.

In addition, the short-term scenario includes plans for a store, but not for a restaurant facility. Fuel would be provided from an above ground storage tank and would only be authorized to support boating activities; vehicle fueling facilities would not be authorized. The concessioner would be responsible for providing generators for electricity, as well as a standpipe system on the marina for fire protection. Since there is a fish cleaning station currently located at Hemenway Harbor, an additional fish cleaner would not be authorized.

For both alternatives, the interim relocation addresses the installation of some minor utilities and a small expansion of visitor services.

Under the interim scenario the concessioner would work with local utility companies to upgrade the utilities for electricity and telephone lines from existing lines in the area (Figure 4). The concessioner would work with the National Park Service to install above- or below-ground water lines, mobile restrooms and signage. Lighting may be installed in the future. The concessioner would not be permitted to move their existing dry storage area. The National Park Service has not yet determined if the restaurant facility would be reopened, nor has a determination been made regarding wastewater needs and provisions under the interim scenario. The concessioner and the National Park Service would consult with the Nevada Division of Environmental Protection (NDEP) to determine wastewater requirements and provisions. The concessioner and the National Park Service would work with the Nevada State Health Division for the water line requirements.

The interim scenario would also require that all land facilities remain within the existing road corridor and parking area. Only minimal, reversible impacts to the resources would be considered and no major commitment of resources would be authorized.

Under both alternatives, the components of the marina move are as follows. A fenced staging area would be authorized below the high water mark, in a previously disturbed area, to prepare for and complete the move. The fenced area would be removed upon completion of the relocation. The anchoring system would be set prior to the dock components being moved. Anchors would be poured and moved on-site. The marina would be moved on the water in a minimum of four sections; the breakwater would be moved in two sections; and the walkway would be moved in one piece. The move would be approximately 15 miles, with a timeline of 2 weeks for completion, weather permitting, and temporary closures would be required to accommodate the move. Navigational aids would be relocated to the perimeter of the area surrounding the new marina location.

The total on-the-water area encompassed by the marina, including the breakwater, would be 1200 by 1700 feet. The marina would extend 400 feet on either side of the headwalk and 1500 feet into the water. A breakwater would be placed around the perimeter of the marina, 200 feet from the docks.

Proposed Utilities Alternatives B and C

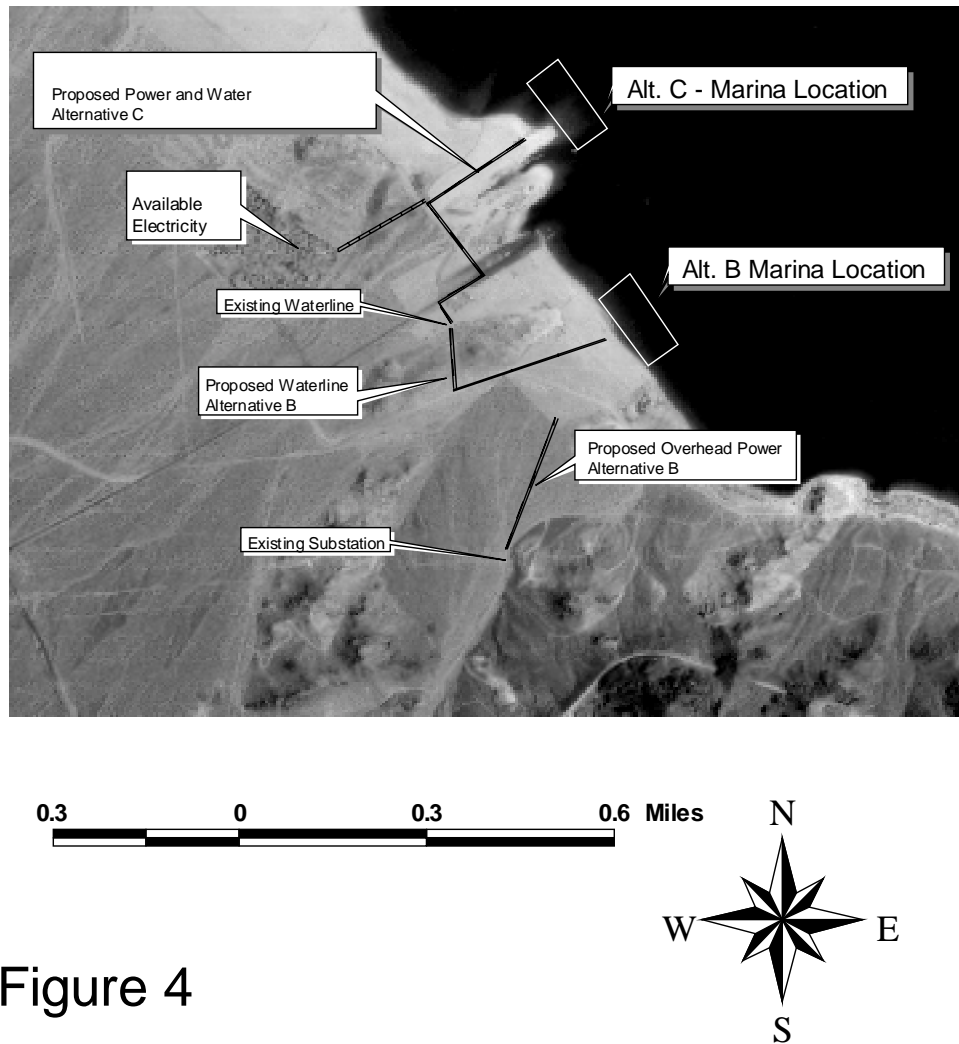


Figure 4

Alternative B-Relocation to Horsepower Cove, Management-Preferred Alternative

Under this alternative, Las Vegas Bay Marina would be relocated to Horsepower Cove. Horsepower Cove is located in the Hemenway Harbor area, southeast of the Hemenway launch ramp (Photo 3). The existing asphalt road base, which is in poor condition, would be removed and the road would be graded, resulting in a 0.53-mile dirt access road, 28 feet wide (Photo 4). The existing dirt parking area would be graded to improve its definition and provide for 300 parking spaces (Photo 5). Both the access road and the parking lot would be located on previously disturbed land or below the high water mark. An alternate parking area would be designated for use during high water periods. However, this alternative parking area would not be graded or utilized unless necessary if water levels were to rise. The main walkway to the site would be located between the existing restrooms and down the access road. The lake bottom contour in this area has been surveyed and is well suited for a marina anchoring system. Some natural protection from wind and wave action is provided in this area. The marina would extend into a small portion of an adjacent SCUBA area.

Alternative C-Relocation to Hemenway Point

Under this alternative, Las Vegas Bay Marina would be relocated to Hemenway Point. Hemenway Point is located immediately north of the Hemenway launch ramp and is one of the two main beaches in the Boulder Beach area (Photo 6). A 0.27-mile, 28-foot wide access road would be graded. A dirt parking lot would be graded to provide for 300 parking spaces. Both the access road and the parking lot would be located on previously disturbed land below the high water mark (Photo 7). An alternate parking area would be designated during high water periods. However, this alternative parking area would not be graded or utilized unless necessary if water levels were to rise. The access road would be located in a potential flood area as it would be located below the high water line. The marina would be located in an open harbor area with no natural protection from wind and wave action. The accessible fishing area currently at Hemenway Point would be relocated to another location in the Hemenway Harbor area. As the lake elevation recedes, the marina would fill out the entire area between the shore and the Boulder Islands. In addition, during periods of low water levels the marina would be located in close proximity to the underwater batch plant, a popular SCUBA diving attraction.



Photo 3. Alternative B – Horsepower Relocation Site



Photo 4. Alternative B – Existing Road



Photo 5. Alternative B. Horsepower Cove



Photo 6. Alternative C – Hemenway Point Relocation Site



Photo 7. Alternative C- Hemenway Point Access Road

Alternative D – Close and Buy-out Marina Facilities

Under this alternative, the concession facility would close down completely, effectively terminating a visitor service that has been in existence within Lake Mead NRA for 45 years. Facilities and services could possibly be relocated to other marinas within the Boulder Basin, consistent with the *Lake Management Plan and Environmental Impact Statement*. The concessioner is currently operating under a letter of extension from the National Park Service as its contract expired on October 31, 1987. The effective date of the closure would be December 31, 2002, the expiration date of the letter of extension.

The concessions contract with Las Vegas Bay Marina specifically requires that the National Park Service provide the concessioner “assurance of security of [its] investment.” The contract also states that “this contract will be consistent with reasonable protection to the Concessioner against loss of its investment.” In addition, the National Park Service Concessions Management Improvement Act of 1998 (Title IV, Public Law 105-391) provides for the protection of concessioner investments and requires that a concessioner shall be entitled to receive compensation for its improvements according to its contract. The contract defines these improvements as buildings, structures, fixtures, equipment, and other improvements, affixed to or resting upon the lands assigned in the contract. Such improvements include those that were in existence upon the execution date of the contract, as well as those constructed upon or affixed to the lands assigned at any time after the execution date of the contract.

Therefore, under this alternative, upon closure of the facility, the National Park Service would buyout the concessioner’s interest in all investments and improvements constructed and utilized for the purpose of this concession contract. This would require payment by the National Park Service of the fair value of all investments, without regard to the term of the contract. Fair value would be determined upon the basis of reconstruction cost less depreciation evidenced by its condition and prospective serviceability in comparison with a new unit of like kind, but not to exceed fair market value. Merchandise and supplies would be valued at replacement cost including transportation. Equipment would be valued at replacement cost less depreciation and obsolescence. In addition, the National Park Service would pay the concessioner for the cost of restoring the land at Las Vegas Bay Marina to a natural condition, for the cost of transporting moveable property of the concessioner to a reasonable market for sale, and for the actual cost to the concessioner of removal or demolition of improvements, less the resulting salvage value.

If the concessioner and the National Park Service would not agree upon the fair value of any item or items, the parties would enter into arbitration, and the fair value of the item or items would be determined by the majority vote of a board of three arbitrators.

Mitigation and Monitoring

Mitigation measures are specific actions designed to minimize, reduce, or eliminate impacts of alternatives and to protect Lake Mead NRA resources and visitors. Monitoring activities are actions to be implemented during or following construction. The following mitigation related to building entrance facilities would be implemented under each alternative, and are assumed in the analysis of effects for each alternative.

Soils and Vegetation

If previously undisturbed sites are disturbed during the project, restoration would be considered and integrated into the project if determined necessary by Resource Management Restoration Specialist. Topsoil salvage would occur where necessary. The area of disturbance would be surveyed and seeds and native cactus would be collected if recommended by the restoration specialist.

Wildlife, Wildlife Habitat, and Aquatic Life

New ground disturbance will be held to the minimal necessary. Construction limits will be delineated for road grading in any undisturbed habitats. Best management practices will be incorporated in all marina operations.

Special Status Species

Lake Mead is designated critical habitat for the razorback sucker. While razorback suckers have not been recorded in the two alternative sites for the relocation of the marina, they have been recorded, and a known spawning area is located nearby the current site of the Las Vegas Bay Marina. Under the scope of the *Lake Management Plan and draft Environmental Impact Statement*, the U.S. Fish and Wildlife Service expressed concerns about the potential for operations at the existing site of the Las Vegas Bay Marina to adversely impact the razorback sucker. Their primary concern involved the potential for a large oil or gasoline spill. Moving the marina from its present location should serve to better protect the known spawning site of the razorback sucker.

In addition, potential habitat for the desert tortoise is located nearby the two alternative sites for the relocation. Generally, the shoreline areas below high water line are considered unsuitable habitat for the desert tortoise. The area below the maximum pool elevation, where work would occur as a result of the relocation of the marina, is composed of bare ground, rocks, or non-native tamarisk. Upland areas and desert washes provide better habitat. cursory surveys of the potential project area have shown that the alternative project sites are not located in desert tortoise habitat.

All maintenance staff at Lake Mead NRA have had formal desert tortoise training. They are aware and would follow the appropriate procedures in the highly unlikely event that a desert tortoise is found on the project site. If tortoises are found in the project area and require handling, National Park Service would initiate formal consultation with USFWS immediately.

No other species of concern is present in the alternative project locations. Informal consultation with Fish and Wildlife Service (USFWS) would be conducted to finalize the determination of no effect and not likely to adversely affect threatened and endangered species.

The project lead would designate a field contact representative. The field representative would be responsible for overseeing compliance with protective stipulations for the desert tortoise and for coordinating with the USFWS. The field representative would have the authority to halt activities or construction equipment that may be in violation of the stipulations.

Cultural Resources

The National Park Service will consult with the Nevada State Historic Preservation Office (SHPO) to determine the significance of the archeological sites located in the project area. If the sites are significant and determined eligible for the National Register of Historic Places (NRHP), all necessary steps will be taken to avoid them during project activities. If the resources cannot be avoided, the National Park Service will consult with the SHPO to develop a plan to mitigate any adverse effects caused by the project.

The National Park Service will consult with the appropriate Native American groups as required by the various laws, regulations, and executive orders.

Water Resources

National Park Service Best Management Practices would be required for marina operations.

Air Quality

Dust control measures would include watering the road and parking areas during grading operations, and applying a dust palliative to control dust.

Visitor Use and Experience

Alternative locations would be selected for displaced recreationists if a relocation site is selected.

Public Safety

Navigational markers and no-wake areas would be established around the marina if it is relocated elsewhere in the recreation area. Security, public notification, and a park ranger would assist with the actual move to protect the public.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

Criteria for Selecting Relocation Alternatives

Alternatives for the relocation of the marina operations were selected based on the sites being close to existing utilities, including water, sewer, and electricity; road access; the available land area below high water and the level of site preparation needed for parking;

the suitability of the underwater topography, the proximity to other marina facilities with a goal of locating marinas at least 3 miles apart; potential flood risk; and other resource concerns.

Several sites were considered when determining the feasible locations for the move of the marina operations. The Lake Mead NRA General Management Plan includes a recommendation to place a marina at Boxcar Cove when Las Vegas Bay and Callville Bay have been developed to the maximum levels as identified in the plan. However, Boxcar Cove is no longer considered a feasible location due to its location in a flood channel and the absence of utilities in the general vicinity. Moving the marina to a different location within or nearby Las Vegas Bay was also ruled out. This area will continue to be at risk due to the expanding delta, plus if lake levels continue to drop as expected, there would not be room enough at the existing site to support a marina. Saddle Cove and Scuba Beach were also considered in the formulation of alternatives. These sites were ruled out due to the lack of shoreline space and unsuitable underwater topography.

Several recent studies were commissioned to gain more information on the depth and extent of sediment disposition in Las Vegas Bay. A meeting was held on July 18, 2002, between area scientists, National Park Service officials, and marina operators to review the initial findings of these studies, and to generate feasible options to slow or halt the spread of the delta to save the marina from inundation. The following options were discussed and discarded because the group concluded that they are not feasible, based on the time allotted for the project, potential for project success and completion, and economic viability.

Sediment Management Options, including:

- Erosion control in the Wash
- Vegetation on the exposed Delta
- Training dike
- Dredging of accumulated sediment
- Sediment detention structures
- Rerouting channel
- Outfall pipe

CONSULTATION, COORDINATION AND PERMIT REQUIREMENTS

A press release was provided to area newspapers announcing the scoping period was released on August 5. In addition, a letter was sent to local, state, and federal agencies, Indian tribes, and marina operators in the region to gather information related to issues and alternatives for the proposed project. More than 30 written comments were received during the scoping period. The majority of the authors were concerned over a potential marina closure, and supported the relocation of marina facilities to Horsepower Cove.

Several meetings occurred internally, and with interested agencies, to develop alternatives and address issues related to the expanding delta at Las Vegas Bay. On July

18, a meeting was held by the National Park Service to determine feasible solutions to address the expanding delta issue. Attendees included representatives from the National Park Service, Bureau of Reclamation, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Nevada Division of Wildlife, Colorado River Commission, City of Las Vegas, Clark County Sanitation District, Clark County Flood Control District, Southern Nevada Water Authority, City of Henderson, and the Concessioners from Las Vegas Bay Marina.

In addition, the following consultation and coordination will occur as part of this environmental assessment.

- U.S. Army Corp of Engineers Permit Requirements
- Coordination with Nevada Division of Environmental Protection
- Coordination with Nevada State Health Division
- Informal consultation with the U.S. Fish and Wildlife Service
- Tribal consultation
- Public distribution and review of EA (15 days)

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The environmentally preferred alternative is the alternative that will promote NEPA, as expressed in Section 101 of NEPA. This alternative will satisfy the following requirements:

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- Assure for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and,
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative B is considered the most environmentally preferable alternative because overall it would best meet the requirements in Section 101 of NEPA. It is more

beneficial than closing the marina facilities as it would meet the beneficial uses requirement, to allow for the continued balance between population and resource use to permit a wide sharing of life's amenities. It would allow for the preservation of resources, while providing an environment that supports diversity and individual choice. It would assure, through the continuation of marina services, for all generations, a safe, healthful, productive, and esthetically and culturally pleasing surrounding.

Comparison of Impacts

Table 2 summarizes the potential impacts associated with each alternative. Table 2 focuses on comparing the short-term impacts, while Table 3 summarizes the potential long-term impacts of the alternatives. Short-term impacts are not included in this table, but are analyzed in the Environmental Consequences section. Impact intensity, context, and duration are also defined in the Environmental Consequences section.

TABLE 2. Comparison of Potential Impacts

| IMPACT TOPIC | ALTERNATIVE A | ALTERNATIVE B | ALTERNATIVE C | ALTERNATIVE D |
|--|--|--|--|---|
| Soils and Vegetation | Negligible adverse impacts to previously disturbed soils | Some disturbance of soils below the high water elevation. Negligible adverse impacts to previously disturbed soils | Some disturbance of soils below the high water elevation. Negligible adverse impacts to previously disturbed soils | No effect |
| Wildlife, Wildlife Habitat and Aquatic Life | No adverse effects | Impacts associated with disturbance in low quality habitat. Negligible adverse effects | Impacts associated with disturbance in low quality habitat. Negligible adverse effects | No effect |
| Special Status Species | No effect | Slight beneficial effect from removing existing marina from Las Vegas Bay | Slight beneficial effect from removing existing marina from Las Vegas Bay | Slight beneficial effect from removing existing marina from Las Vegas Bay |
| Water Resources | No effect | Minor to moderate adverse effects from normal marina operations | Minor to moderate adverse effects from normal marina operations | No effect |
| Floodplains | No effect | No effect | No effect | No effect |
| Air Quality | No effect | Minor to moderate adverse effects from dust generated from construction and vehicular use of dirt roads and parking lots | Minor to moderate adverse effects from dust generated from construction and vehicular use of dirt roads and parking lots | No effect |

| IMPACT TOPIC | ALTERNATIVE A | ALTERNATIVE B | ALTERNATIVE C | ALTERNATIVE D |
|---|---|--|---|--|
| Visual Resources | No effect | Negligible to minor adverse effects from locating a facility in an area that presently has no structures | Negligible to minor adverse effects from locating a facility in an area that presently has no structures | No effect |
| Recreation Resources | Major adverse effects from the eventual loss of the marina operation | Moderate to major adverse effects due to displacement of recreational opportunities | Moderate to major adverse effects due to displacement of recreational opportunities | Major adverse effects from immediate loss of marina operation |
| Visitor Use and Experience and Public Safety | Major adverse effects to recreationists who currently utilized Las Vegas Bay Marina | Some beneficial effects for marina users; minor to moderate adverse effects associated with displacement | Some beneficial effects for marina users; minor to major adverse effects based on crowding in Hemenway Harbor and displacement. | Major adverse effects for marina users. |
| Socioeconomic Resources | Major adverse impacts from loss of revenue at Las Vegas Bay Marina | Beneficial effects from allowing continuation of operations | Beneficial effects from allowing continuation of operations | Moderate to major adverse effects as fair value is paid to marina operators |
| Recreation Area Operations | Minor to major adverse effects; potential for major adverse effect if inundation occurs | Moderate to major effect impacts for planning and working on facility relocation | Moderate to major effect impacts for planning and working on facility relocation | Moderate adverse effects for planning and carrying out buy-out of marina facilities and follow-up work |
| Cultural Resources | No effect | No effect | No effect | No effect |

Table 3. Potential Long-term Impacts

| Impact Topics | Alternative A | Alternative B | Alternative C | Alternative D |
|--|-----------------------------------|---|---|-----------------------------------|
| Soils and Vegetation | No long-term effect | Negligible to minor adverse long-term effects | Negligible to minor adverse long-term effects | No effect |
| Wildlife, Wildlife Habitat and Aquatic Life | No long-term effect | No long-term effect | No long-term effect | No long-term effect |
| Special Status Species | Some beneficial long-term effects | Some beneficial long-term effects | Some beneficial long-term effects | Some beneficial long-term effects |
| Cultural Resources | No effect | No effect | No effect | No effect |
| Water Resources | No effect | Some detectable localized adverse effects | Some detectable localized adverse effects | No effect |
| Floodplains | No long-term effect | No long-term effect | No long-term effect | No long-term effect |
| Air Quality | No long-term effect | No long-term effect | No long-term effect | No long-term effect |
| Visual Resources | No long-term effect | Minor adverse effects | Minor adverse effects | No long-term effect |
| Recreation Resources | Major adverse effect | Minor adverse effects | Minor adverse effects | Major adverse effects |
| Visitor Use and Experience and Public Safety | Major adverse effect | Minor to moderate adverse effects; potentially beneficial effects | Minor to moderate adverse effects; potentially beneficial effects | Major adverse effect |
| Socioeconomic Resources | Major adverse effect | Some beneficial effects | Some beneficial effects | Major adverse effect |
| Recreation Area Operations | No long-term adverse effect | Some long-term adverse effect | Some long-term adverse effect | No long-term adverse effect |

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SECTION III: AFFECTED ENVIRONMENT

Introduction

This section provides a description of the existing environment in the project area and the resources that may be affected by the proposals and alternatives under consideration. Complete and detailed descriptions of the environment and existing use at Lake Mead NRA is found in the *Lake Mead NRA Lake Management Plan and draft Environmental Impact Statement* (2002), *Lake Mead NRA Resource Management Plan* (NPS 2000) and the *Lake Mead NRA General Management Plan* (NPS 1986).

The area of concern for the proposed project is located in the Boulder Basin development zone of Lake Mead, and includes the 15-mile stretch between Las Vegas Bay and the Hemenway Wall. This area is a high use area occupied by beach areas, launching sites, marina operations at Lake Mead Marina, access roads, utility corridors, campgrounds, a trailer village, a hotel, boat storage and maintenance facilities, Lake Mead Ferry Service, and special use areas for sailing, scuba, and personal watercraft use. This area currently exceeds four million visitors a year.

The original location of the Lake Mead Marina, is located in this area at Fishing Point. This marina relocated from this area to its present location in the 1960s. This area currently has paved access from Lakeshore Road to Hemenway Harbor road, then by dirt roads to coves on either side of Hemenway Harbor.

Natural Resources

Three of America's four desert ecosystems, the Mojave, the Great Basin, and the Sonoran Deserts, meet in Lake Mead NRA. The project area is characteristic of the Mojave Desert, with low precipitation (averaging 8 to 23 centimeters per year [3 to 9 inches per year]), low humidity, and wide extremes in daily temperatures. Winters are relatively short and mild, and summers are long and hot. The prevailing wind direction is from the south.

Geology, Topography, and Soils

The majority of Lake Mead NRA is characterized by generally north-south trending mountain ranges separated by broad, shallow valleys. The lakeshore in the area of concern is characterized by flat, broad slopes with numerous desert washes leading to various points into Lake Mead.

Vegetation.

Much of the shoreline area of Lake Mead is composed of non-native vegetation, such as tamarisk, and rocks, and bare ground. This is due to the fluctuating water levels of the lakes.

Wildlife and Aquatic Resources

The shoreline areas of the Lake Mead generally provide only low quality habitat for wildlife due to the lack of vegetative cover, forage, and food sources. Small mammals, reptiles, and coyotes generally will utilize these areas when utilizing the water sources. If vegetation is present, birds, such as Gambel quail, rock doves, and ravens, utilize the areas. Ravens and coyotes frequent the developed areas of the recreation area due to the presence of humans and food sources. Waterfowl, such as mallards and coots, generally can be found on the lake around developed areas.

A number of fish species occupy Lake Mead, including game, nongame, and endemic fish species. Nongame species, such as carp, and game fish species, including largemouth bass, striped bass, catfish, crappie, and blue gill inhabit the waters of Lake Mead. Rainbow trout are stocked in selective areas of Lake Mead, including in the Boulder Basin area. Base productivity of Lake Mead is low. Game fish species depend upon the production of the threadfin shad. Rainbow trout are becoming increasingly significant as prey species for striped bass.

Special Status Species

The National Park Service consulted the most recent listing of Endangered, Threatened, and Candidate Species prepared by the USFWS (Appendix A). Included in their response were the desert tortoise (*Gopherus agassizii*), razorback sucker (*Xyrauchen texanus*), and critical habitat for the razorback sucker.

The desert tortoise, Mojave population, is a federally listed threatened species. The state of Nevada classifies the desert tortoise as protected and rare outside the urban areas of Clark County (Las Vegas). The Mojave population is found to the west and north of the Colorado River and is subdivided into two subpopulations, western and eastern. Eastern Mojave tortoises are found in creosotebush, burrobrush (*Ambrosia dumosa*), and creosotebush/ Joshua tree (*Yucca brevifolia*) vegetation types. The Mojave population of the desert tortoise is threatened by loss and degradation of habitat due to construction activities (roads, pipelines, powerline, housing developments, energy developments, etc.), mining, grazing, and off-road vehicle use. A recently identified upper respiratory disease, predation of juveniles by common ravens, illegal collection, and vandalism also are threats to the population. Tortoise populations are probably dependent on relatively rare years of sufficient forage for reproduction and survival. Tortoises are generally active in the spring and fall when annual plants are most abundant, and they must consume their forage requirement during this active period. Tortoises usually spend the remainder of the year in burrows or dens, out of the extreme weather conditions of the desert. Burrows may be under or between bushes, in the banks or beds of washes, in rock outcrops, or in caliche caves.

Lake Mead is designated critical habitat for the razorback sucker (*Xyrauchen texanus*). Two spawning sites have been found on Lake Mead, including an area nearby the current

location of Las Vegas Bay Marina. No spawning activities have been reported in other areas along the shoreline of the Boulder Basin, or in the proposed project sites.

Other Species. The following special status species are found in Lake Mead NRA, but not in the project area: bald eagle (*Haliaeetus leucocephalus*), Southwestern willow flycatcher (*Empidonax traillii extimus*), bonytail chub (*Gila elegans*), and relict leopard frog (*Rana onca*).

There are no federally listed plant species known to occur in the recreation area. The following sensitive species are found in the desert regions of Lake Mead NRA but not in the project area: Las Vegas bearpoppy (*Arctomecon californica*), three corner milkvetch (*Astragalus geyeri* var. *triquetrus*), Sticky buckwheat (*Eriogonum viscidulum*), and rosy two-toned penstemon (*Penstemon bicolor* ssp. *roseus*).

Water Resources

Lake Mead and Lake Mohave are the primary water resources in the region. Access roads, in general, cross numerous washes that empty into the lakes. These washes are typically dry, although they are subject to seasonal flash flooding, primarily in the late summer and early fall months.

Air Quality

Under the Clean Air Act Amendments of 1990, the US Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for six “criteria pollutants”: lead, ozone, sulfur dioxide, oxides of nitrogen, carbon monoxide (CO), and particulate matter smaller than 10 microns in diameter (PM10). Based on air quality monitoring data, a portion of Clark County (Las Vegas planning area’s Hydrographic Basin 212) has been designed as being in serious non-attainment with the NAAQS for MP10 and CO (EPA 2001). The project area is not located within the non-attainment boundary (Langston 2001).

The Nevada Division of Environmental Protection, Bureau of Air Quality has air quality jurisdiction over all counties in Nevada, except for Washoe and Clark counties, which have their own distinct jurisdictions. The Air Quality Division of the Clark County Health District is the regulatory and enforcement agency for air quality matters in Clark County.

The National Park Service, Air Resources Division and USFWS, Air Quality Branch together have responsibility for approximately 378 park units and 503 refuges, for which the Clean Air Act designates Class I and Class II air quality area. Class I includes the following areas that were in existence as of August 7, 1977; national parks over 2,428 hectares (6,000 acres), national wilderness areas and national memorial parks over 2,024 hectares (5,000 acres), and international parks. Class II areas are parts of the country protected under the Clean Air Act but identified for somewhat less stringent protection from air pollution damage than a Class I area, except in specified cases (National Park Service 2001). Lake Mead NRA is designated as a Class II air quality area, and air

quality in the region is generally good. Most reductions in air quality are due to air flows from the Las Vegas Valley west of Lake Mead NRA (NPS 2001).

Clean Air Act Conformity Requirements: The EPA has promulgated rules that establish conformity analysis procedures for transportation-related actions and for other (general) federal agency actions. The EPA general conformity rule requires a formal conformity determination document for federally sponsored or funded actions in non-attainment areas or in certain designated maintenance areas when the total direct and indirect net emissions of non-attainment pollutants (or their precursors) exceed specified *de minimis* levels. Since the project area is not within a non-attainment area, Clean Air Act conformity does not apply.

Soundscapes

Noise-sensitive receptors are those locations where activities that could be affected by increased noise levels occur and include locations such as residences, motels, churches, schools, parks, and libraries. Existing noise levels are determined for the outdoor living area at sensitive receptors. There are no sensitive receptors in the project area, other than Lake Mead NRA. The dominant noise source in the project area is automobile and truck traffic on Lakeshore Road, overflights, and boat traffic at Hemenway Harbor and on the Boulder Basin.

Cultural Resources

Historic Overview: Prehistory

Archeologists have identified a series of Native American cultures that have occupied Lake Mead NRA and adjacent areas in southern Nevada and Western Arizona over the last 12,000 to 13,000 year. These cultures have been divided into discrete time periods based on various criteria, i.e. changes in technology, the types of animal and plant foods used, or the migration of peoples into and out of the area.

Occupation of the area began at the end of the late Pleistocene around 12,000 to 13,000 years ago with the Paleoindian period. The Paleoindian period lasted into the Holocene and ended around 7,000 before present (BP). The Pleistocene was dominated by greater rainfall and moderate temperature, which created an environment of vast lakes and humid conditions. During the Paleoindian period of the early Holocene, the environment was characterized by a general trend to warmer and dryer conditions. Paleoindian peoples lived in small, highly nomadic groups, utilized wild plant foods, and hunted now extinct big game. Physical remains from the Paleoindian period usually consist of flaked stone tools and the by products of tool manufacture, e.g. flakes and spent cores.

The Archaic period (7,000 to 2,000 [BP]) is characterized by nomadic peoples living in small groups adapted to the mosaic of microenvironments created by the overall warmer and dryer conditions. Their subsistence was based on gathering wild plant foods and hunting small game. Flaked stone tools and the by products of tool manufacture, along with the common occurrence of ground stone artifacts, typify the Archaic period.

The arrival of Anasazi peoples from the east marked the end of the Archaic period and the beginning of the Saratoga Springs period. The Saratoga Springs period (2,000 to 750 BP) was dominated by the expansion of the Virgin Anasazi into the Lake Mead area, and their eventual withdrawal. The Virgin Anasazi were Puebloan peoples who used pottery and lived in permanent structures, which changed from pithouses to above-ground Puebloan-type room structures. They practiced some horticulture but still depended heavily on wild plant and animal foods.

The Late Prehistoric lifeway, which began around 750 BP, was similar to Archaic adaptations. The people lived in small mobile groups, gathered wild plant foods, and hunted small game. They also practiced small scale horticulture. Archaeologically, these people are indistinguishable from the Mojave, Quechan, Hualapai, and Havasupai (Yuman-speaking peoples) and the Southern Paiute (Numic-speaking peoples) who occupied the area during the Historic period.

Euro-American History

The Spanish and later the Mexicans were the first whites to explore the area. During the Spanish/Mexican period (1500s to 1840s) trade routes were established between the population centers in New Mexico and the colonies in California. These trade routes included the Mojave Trail and the Old Spanish Trail, which passed through Southern Nevada.

The Mormons were the first to establish permanent white settlements in Southern Nevada. These included Las Vegas, St. Thomas, and Callville, the latter two of which were inundated by Lake Mead. During the late 1800s and early 1900s, the prosperity of these communities and others in the area was determined by the boom and bust cycles of the mining and ranching industries that formed the economic base of the area.

The construction of Hoover Dam in the 1930s dramatically changed the landscape of southern Nevada and Western Arizona. It brought thousands of people to the area, put Las Vegas on the map, and helped develop the area's current economy based on recreation and tourism.

Socioeconomic Resources, Park Operations, and Visitor Use

Lake Mead NRA was designated as the first NRA in 1964. It is composed of 595,041 hectares (1,470,328 acres) of federal land and 10,254 hectares (25,338 acres) of nonfederal land, for a total of approximately 605,296 hectares (1.5 million acres) (NPS 2001e). Lake Mead NRA users include boaters, swimmers, fishermen, hikers, photographers, roadside sightseers, backpackers, and campers. Recreation visits in 1999 totaled just over nine million (NPS 2001e).

The Las Vegas Bay Marina is a 3-generation, family-run concession located at the inflow of the Las Vegas Wash since the 1960s. This concessioner provides 635 rental slips for wet storage of visitors' boats, has a fleet of 65 rental vessels, operates a floating gas dock, a floating store and restaurant, land-based fuel facility, boat repair facilities and a 300-

space dry boat storage facility with both open and covered spaces. Gross revenue for the 2001 and 2000 operating years was \$4.0 million and \$4.3 million, respectively. Visitation to the Las Vegas Bay developed area in 2001 was 722,000 visitors, based on the traffic counter located on the developed area access road.

SECTION IV: ENVIRONMENTAL CONSEQUENCES

Introduction

This section presents the likely beneficial and adverse effects to the natural and human environment that would result from implementing the alternatives under consideration. This section describes short-term and long-term effects, direct and indirect effects, cumulative effects, and the potential for each alternative to impair park resources. Interpretation of impacts in terms of their duration, intensity (or magnitude), and context (local, regional, or national effects) are provided where possible.

Methodology

This section contains the environmental impacts, including direct and indirect effects and their significance to the alternatives. It also assumes that the mitigation identified in the *Mitigation and Monitoring* section of this EA would be implemented under any of the applicable alternatives, as identified in each mitigation criteria.

Impact analyses and conclusions are based on National Park Service staff knowledge of resources and the project area, review of existing literature, and information provided by experts in the National Park Service or other agencies. Any impacts described in this section are based on preliminary design of the alternatives under consideration. Effects are quantified where possible; in the absence of quantitative data, best professional judgment prevailed.

Criteria and Thresholds for Impact Analysis

The following are laws, regulations, and/ or guidance that relates to the evaluation of each impact topic.

Soils and Vegetation

Laws, Regulations, and Policies: Soil resources would be protected by preventing or minimizing adverse potentially irreversible impacts on soils, in accordance with National Park Service Management Policies. National Park Service-77 specified objectives for each management zone for soil resources management. These management objectives are defined as: (1) natural zone- preserve natural soils and the processes of soil genesis in a condition undisturbed by humans; (2) cultural zone- conserve soil resources to the extent possible consistent with maintenance of the historic and cultural scene and prevent soil erosion wherever possible; (3) park development zone- ensure that developments and their management are consistent with soil limitations and soil conservation practices; and, (4) special use zone- minimize soil loss and disturbance caused by special use activities, and ensure that soils retain their productivity and potential for reclamation.

The National Park Service Organic Act directs the park to conserve the scenery and the natural objects unimpaired for future generations. National Park Service *Management*

Policies defines the general principles for managing biological resources as maintaining all native plants and animals as part of the natural ecosystem. When National Park Service management actions cause native vegetation to be removed, then the National Park Service will seek to ensure that such removals will not cause unacceptable impacts to native resource, natural process, or other park resources.

Exotic species, also referred to as non-native or alien, are not a natural component of the ecosystem. They are managed, up to and including eradication, under the criteria specified in *Management Policies* and *NPS-77*.

Zones within the recreation area have been designated in the Lake Mead NRA General Management Plan, which provides the overall guidance and management direction for Lake Mead NRA.

Impact Indicators, Criteria, and Methodology: The impacts to vegetation were evaluated in terms of impacts to native vegetation and non-native vegetation. The following were used in interpreting the level of impact to vegetation and soils in the proposed project areas.

- *Negligible impacts:* Impacts have no measurable or perceptible changes in soil structure and occur in a relatively small area. Impacts have no measurable or perceptible changes in plant community size, integrity, or continuity.
- *Minor impacts:* Impacts are measurable or perceptible, but localized in a relatively small area. The overall soil structure would not be affected. Impacts are measurable or perceptible and localized within a relatively small area. The overall viability of the plant community would not be affected and, if left alone, would recover.
- *Moderate impacts:* Impacts would be localized and small in size, but would cause a permanent change in the soil structure in that particular area. Impacts would cause a change in the plant community (e.g. abundance, distribution, quantity, or quality); however, the impact would remain localized.
- *Major impacts:* Impact to the soil structure would be substantial, highly noticeable, and permanent. Impacts to the plant community would be substantial, highly noticeable, and permanent.
- *Impairment:* For this analysis, impairment is considered a permanent change in a large portion of the overall acreage of the park, affecting the resource to the point that the park's purpose could not be fulfilled and the resource would be degraded precluding the enjoyment of future generations. The impact would contribute substantially to the deterioration of the park's native vegetation. These resources would be affected over the long-term to the point that the park's purpose (Enabling Legislation, *General Management Plan*,

Strategic Plan) could not be fulfilled and resource could not be experienced and enjoyed by future generations.

Wildlife, Wildlife Habitat, and Aquatic Life

Laws, Regulations, and Policies: The National Park Service Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the National Park Service to mean native animal life should be protected and perpetuated as part of the recreation area's natural ecosystem. Natural processes are relied on to control populations of native species to the greatest extent possible. The restoration of native species is a high priority. Management goals for wildlife include maintaining components and processes of naturally evolving park ecosystems, including natural abundance, diversity, and ecological integrity of plants and animals.

The recreation area also manages and monitors wildlife cooperatively with the Arizona Game and Fish department and the Nevada Division of Wildlife.

Impact Indicators, Criteria, and Methodology: The impacts of wildlife were evaluated in terms of impacts to individual animals and wildlife habitat. Specific localized impacts were estimated based on knowledge garnered from similar past activities.

The following are standards used by the National Park Service in interpreting the level of impact to wildlife:

- *Negligible impacts:* No species of concern is present; no impacts or impacts with only temporary effects are expected.
- *Minor impacts:* Nonbreeding animals of concern are present, but only in low numbers. Habitat is not critical for survival; other habitat is available nearby. Occasional flight responses by wildlife are expected, but without interference with feeding, reproduction, or other activities necessary for survival.
- *Moderate impacts:* Breeding animals of concern are present; animals are present during particularly vulnerable life-stages, such as migration or winter; mortality or interference with activities necessary for survival expected on an occasional basis, but not expected to threaten the continued existence of the species in the park.
- *Major impacts:* Breeding animals are present in relatively high numbers, and/or wildlife is present during particularly vulnerable life stages. Habitat targeted by actions has a history of use by wildlife during critical periods, but there is suitable habitat for use nearby. Few incidents of mortality could occur, but the continued survival of the species is not at risk.
- *Impairment:* The impact would contribute substantially to the deterioration of natural resources to the extent that the park's wildlife and habitat would no

longer function as a natural system. Wildlife and its habitat would be affected over the long-term to the point that the park's purpose (Enabling Legislation, *General Management Plan*, *Strategic Plan*) could not be fulfilled and resource could not be experienced and enjoyed by future generations.

Threatened and Endangered Species, Critical Habitat

Laws, Regulations, and Policies: Section 7 of the Endangered Species Act mandates all federal agencies determine how to use their existing authorities to further the purposes of the Act to aid in recovering listed species, and to address existing and potential conservation issues. Section 7(a)(2) states that each federal agency shall, in consultation with the Secretary of the Interior, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

Management Policies directs the parks to survey for, protect, and strive to recover all species native to National Park System units that are listed under the Endangered Species Act (4.4.2.3). It sets the direction to meet the obligations of the Act. *Management Policies* also directs the National Park Service to inventory, monitor, and manage state and locally listed species, and other native species that are of special management concern to the parks, to maintain their natural distribution and abundance.

The *General Management Plan* designated 1,050,030 acres, or 70 percent of the NRA, as natural zones, and areas with known habitat or potential habitat for rare, threatened, or endangered species were further protected by placement in the environmental protection or outstanding natural feature subzone of the natural zone. Management of these zones focuses on the maintenance of isolation and natural process, and restoration of natural resources.

Impact Indicators, Criteria, and Methodology: The Endangered Species Act defines the terminology used to assess impacts to listed species as follows:

- *No effect:* The appropriate conclusion when the action agency determines that its proposed action would not affect a listed species or designated critical habitat.
- *Is not likely to adversely affect:* The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on the best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- *Is likely to adversely affect:* The appropriate finding if any adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial. In the effect the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action “is likely to adversely affect” the listed species. If incidental take is anticipated to occur as a result of the proposed action, an “is likely to adversely affect” determination should be made.
- *Is likely to jeopardize proposed species/adversely modify proposed critical habitat – (Impairment):* The appropriate conclusion when the action agency or the U.S. Fish and Wildlife Service identify situations in which the proposed action is likely to jeopardize the continued existence of a proposed species or adversely modify the proposed critical habitat.

Water Resources and Water Quality

Laws, Regulations, and Policies: The Clean Water Act, and supporting criteria and standards promulgated by the Environmental Protection Agency (EPA), the Nevada Department of Environmental Protection (NDEP), and the Arizona Department of Environmental Quality (ADEQ) are used at Lake Mead NRA to protect the beneficial uses of water quality, including human health, health of the aquatic ecosystem, and recreational use.

A primary means for protecting water quality under the CleanWater Act is the establishment, implementation, and enforcement of water quality standards. Generally, the federal government has delegated the development of standards to the individual states subject to EPA approval. Water quality standards consists of three components: (1) the designated beneficial uses of a water body, such aquatic life, cold water fishery, or body contact recreation (i.e. swimming or wading); (2) the numerical or narrative criteria that define the limits of physical, chemical, and biological characteristics of water that are sufficient to protect the beneficial uses; and (3) an anti-degradation provision to protect the existing uses and quality of water.

Water quality criteria developed to protect specific uses are updated periodically by the Environmental Protection Agency. New and revised criteria are published in the Federal Register, and summarized periodically in Quality Criteria for Water (U.S. Environmental Protection Agency 1986). Quality Criteria for Water, also known as "the Gold Book," recommends criteria for a state's Water Quality Standards. The criteria are almost always adopted by states as a portion of their standards, and they represent the “minimum” level of protection afforded to the waterbodies of a state.

A state's anti-degradation policy is a three-tiered approach for maintaining and protecting various levels of water quality. In Tier 1 waters, the existing uses of a water body and the quality necessary to protect the uses must be maintained. This is considered to be the

base level of protection that must be applied to the water body. If the water quality in a water body already exceeds the minimum requirements for the protection of the designated uses (Tier 2), then the existing water quality must be maintained. The third level provides protection for the state's highest quality waters or where ordinary use classification may not suffice; these water bodies are Tier 3 waters and are classified as Outstanding National Resource Waters. The existing water quality must be maintained and protected in an Outstanding National Resource Waters. Lakes Mead and Mohave are Tier 1 waterbodies.

Water quality standards are primarily obtained by controlling the pollutants permitted in point source discharges of pollutants into receiving waters through Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) permits, the implementation of Best Management Practices for non-point sources of pollution, and the implementation of Clean Water Act Section 303d Total Maximum Daily Loads (TMDL's) on water bodies that have chronic and persistent violations of water quality standards. The objective of a TMDL is to allocate allowable pollutant loads among different point and non-point sources of pollution.

Water quality in Lake Mead in Nevada is regulated by NDEP under water quality standards and regulations that are promulgated in the Nevada Administrative Code (NAC, Chapter 445A.119-445A.225). Consistent with federal regulations, Nevada has established numerical and narrative standards that protects existing and designated uses of the State's waters, and implements the anti-degradation requirements by establishing "requirements to maintain existing higher quality." Compliance with the numerical standards for water quality is determined at control points that are specified in the regulations.

The NDEP has divided the administration of water quality management in Lake Mead into two discreet units divided by a control point near the confluence of Las Vegas Wash with Lake Mead. Standards for the portion of Lake Mead from the western boundary of Las Vegas Marina Campground to the confluence of Las Vegas wash are generally less strict than for the rest of Lake Mead to accommodate pollution from wastewater discharges and urban runoff from the City of Las Vegas. Requirements to Maintain Existing Higher Water Quality in Lake Mead have been established by NDEP east of the Las Vegas Wash Control Point for a few physical and chemical water quality parameters that includes temperature, pH, chlorophyll a, total dissolved solids, nitrogen, turbidity, and color.

Maximum Contaminant Levels for drinking water are developed under the Safe Drinking Water Act. These National Primary Drinking Water Regulations, for which states have primary enforcement responsibility, are updated periodically by the Environmental Protection Agency. New and revised standards are published in the Federal Register. These standards are applicable to finished drinking water that has undergone treatment processes.

The Lake Mead NRA Resource Management Plan identifies internal threats to water resources, including heavy recreation use in coves from excrement and littering and water quality in harbors by illegal sewage discharge and petrochemical spills. External threats are identified as materials transported to the lakes by outside sources, air pollutants dropping into the lakes, and adjacent land uses and increasing development. The following impact thresholds were established in order to describe the relative changes in water quality (both overall, localized, short, long-term, cumulatively, adverse and beneficial), under the various alternatives, when compared to baseline conditions.

Negligible impacts: Impacts are effects that are not detectable, well below water quality standards and/or historical ambient or desired water quality conditions.

Minor impacts: Impacts are effects that are detectable but well within or below water quality standards and/or historical ambient or desired water quality conditions.

Moderate impacts: Impacts are effects that are detectable, within or below water quality standards, but historical baseline or desired water quality conditions are being altered on a short-term basis.

Major impacts: Impacts are effects that are detectable and significantly and persistently alter historical baseline or desired water quality conditions. Water quality standards are locally approached, equaled, or slightly singularly exceeded on a short-term and temporary basis.

Impairment: Impacts are effects that alter baseline or desired water quality conditions on a long-term basis. Water quality standards are exceeded several times on a short-term and temporary basis.

Air Quality

Laws, Regulations, and Policies: Air pollution sources within parks must comply with all federal, state, and local regulations. The regulations and policies that govern pollutants of concern are discussed briefly below.

Lake Mead NRA is designated as a Class II Air Quality area under the Clean Air Act. The main purpose of this act is to protect and enhance the nation's air quality to promote the public health and welfare. The act establishes specific programs to provide protection for air resources and values, including the program to prevent significant deterioration of air quality in clean air regions of the country. Although Lake Mead NRA is designated as a Class II Air Quality area, the park strives to maintain the highest air quality standards, and project work within the recreation area is completed in accordance with regional standards. However, the recreation area does not possess sufficient autonomous authority to address issues of air quality improvements when air pollution originates outside the boundaries.

National Park Service *Management Policies* direct parks to seek to perpetuate the best possible air quality to preserve natural and cultural resources, sustain visitor enjoyment,

human health, and preserve scenic vistas (4.7). Parks are directed to comply with all federal, state, and local air quality regulations and permitting requirements. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the National Park Service "will err on the side of protecting air quality and related values for future generations."

Impact Indicators, Criteria, and Methodology: Information from the literature was used to assess probable impacts to air quality. There are four impact categories relevant to air quality issues: negligible, minor, moderate and major. Each category is discussed below relative to potential airborne pollution impacts from the alternatives on park resources and human health.

- *Negligible impacts:* There is no smell of exhaust and no visible smoke. Dust from construction activities can be controlled by mitigation.
- *Minor impacts:* There is a slight smell of exhaust and smoke is visible during brief periods of time. Dust from use the dirt roads is visible during brief periods. Dust from construction activities is visible only during the work period, but most can be controlled by mitigation.
- *Moderate impacts:* There is a smell of gasoline fumes and exhaust in high-use areas. Smoke is visible during periods of high use. Dust from the use of dirt roads is visible for an extended area. Dust from construction activities is visible for an extended area for an extended period, but is reduced by mitigation.
- *Major impacts:* Smoke and gasoline fumes are easily detectable for extended periods of time in a large area. Dust from the use of dirt roads and construction activities is visible for an extended period for an extended amount of time, and mitigation is unable to alleviate the conditions.

Criteria and Thresholds for Impact Analyses of all Other Issues

Impacts to floodplains, recreation resources, visitor experience, public safety, socioeconomic resources, visual quality, and recreation area operations were analyzed using the best available information and best professional judgment of park staff.

Terms referring to impact intensity, context, and duration are used in the effects analysis. Unless otherwise stated, the standard definitions for these terms are as follows:

- *Negligible impacts:* The impact is at the lower level of detection; there would be no measurable change.
- *Minor impacts:* The impact is slight but detectable; there would be a small change.

- *Moderate impacts:* The impact is readily apparent; there would be a measurable change that could result in a small but permanent change.
- *Major impacts:* The impact is severe; there would be a highly noticeable, permanent measurable change.
- *Localized Impact:* The impact occurs in a specific site or area. When comparing changes to existing conditions, the impacts are detectable only in the localized area.
- *Short-Term Effect:* The effect occurs only during or immediately after implementation of the alternative.
- *Long-Term Effect:* The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more and could be beneficial or adverse.

Cultural Resources

Laws, Regulations, and Policies: Numerous legislative acts, regulations, and National Park Service policies provide direction for the protection, preservation, and management of cultural resources on public lands. Further, these laws and policies establish what must be considered in general management planning and how cultural resources must be managed in future undertakings resulting from the approved plan regardless of the final alternative chosen. Applicable laws and regulations include the National Park Service Organic Act (1916), the Antiquities Act of 1906, the National Historic Preservation Act of 1966 (1992, as amended), the National Environmental Policy Act of 1969, the National Parks and Recreation Act of 1978, the Archeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and the Curation of Federally Owned and Administered Archeological Collections (1991).

Applicable agency policies relevant to cultural resources include Chapter 5 of National Park Service *Management Policies*, and the *Cultural Resource Management Guideline (DO-28)*, as well as other related policy directives such as the National Park Service *Museum Handbook*, the National Park Service *Manual for Museums*, and *Interpretation and Visitor Services Guidelines (NPS-26)*.

The Antiquities Act of 1906 (P.L. 209) authorized the president to establish historic landmarks and structures as monuments owned or controlled by the U.S. government and instituted a fine for unauthorized collection of their artifacts.

The National Park Service Organic Act (16 USC 1-4) established the agency to manage the parks and monuments with the purpose of conserving historic objects within them and providing for their enjoyment.

The National Historic Preservation Act of 1966 (NHPA; 16 USC 470, et seq.) requires in section 106 that federal agencies with direct or indirect jurisdiction over undertakings take into account the effect of those undertakings on properties that are listed on, or eligible for listing on, the National Register of Historic Places. Section 110 of the act further requires federal land managers to establish programs in consultation with the state historic preservation office to identify, evaluate, and nominate properties to the national register. This act applies to all federal undertakings or projects requiring federal funds or permits.

The National Environmental Policy Act of 1969 (NEPA; P.L. 91-190) sets forth federal policy to preserve important historic, cultural, and natural aspects of our national heritage and accomplishes this by assisting federal managers in making sound decisions based on an objective understanding of the potential environmental consequences of proposed management alternatives. This act applies to any federal project or other project requiring federal funding or licensing. This act requires federal agencies to use a systematic, interdisciplinary approach integrating natural and social sciences to identify and objectively evaluate all reasonable alternatives to a proposed action.

The National Parks and Recreation Act of 1978 (P.L. 95-625) requires that general management plans be developed for each unit in the national park system and that they include, among other things, measures for the preservation for the area's resources and an indication of the types and intensities of development associated with public use of a given unit.

The Archeological Resources Protection Act of 1979 (16 USC 470aa-mm) further codifies the federal government's efforts to protect and preserve archeological resources on public lands by stiffening criminal penalties, as well as instituting civil penalties, for the unauthorized collection of artifacts. Additionally, it establishes a permit system for the excavation and removal of artifacts from public lands, including their final disposition, as well as confidentiality provisions for sensitive site location information where the release of such information may endanger the resource.

The Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) sets forth procedures for determining the final disposition of any human remains, funerary objects, or objects of cultural patrimony that are discovered on public lands or during the course of a federal undertaking.

"The Curation of Federally Owned and Administered Archeological Collections" (36 CFR 79) establishes guidelines and procedures for the proper curation and management of archeological collections owned or administered by federal agencies.

Impact Indicators, Criteria, and Methodology: Impacts on cultural resources were developed based on existing conditions, current regulations, and likely development trends. The inventory of archaeological resources in the park is largely incomplete. For purposes of assessing impacts, all unrecorded resources are considered potentially eligible for listing on the National Register of Historic Places.

The park's inventory of standing structures and cultural landscapes is relatively complete, however, many structures and landscapes still require evaluation to determine their eligibility for listing on the National Register of Historic Places. For purposes of assessing potential impacts to these properties, unevaluated structures and landscapes are assumed to be potentially eligible.

Under section 106, only historic resources that are eligible or are listed on the National Register of Historic Places are considered for impacts. An impact, or effect, to a property occurs if a proposed action would alter in any way the characteristic that qualify it for inclusion on the register. If the proposed action would diminish the integrity of any of these characteristics, it is considered to be an adverse effect.

For the purposes of this document, the level of impacts to cultural resources was accomplished using the following criteria:

- *Negligible impacts:* No potentially eligible or listed properties are present; no direct or indirect impacts.
- *Minor impacts:* Potentially eligible or listed properties are present; no direct impacts or impacts with only temporary effects are expected.
- *Moderate impacts:* Potentially eligible or listed properties are present; indirect impacts or, in the case of structures, where activity is limited to rehabilitation conducted in a manner that preserves the historical and architectural value of the property.
- *Major impacts:* Potentially eligible or listed properties present; direct impacts including physical destruction, damage, or alternation of all or part of a property. Isolation of a property from or alteration of the character of a property's setting when that character contributes to its eligibility, including removal from its historic location. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting. Neglect of a property resulting in its deterioration or destruction (36 CFR 800.5).
- *Impairment:* Loss, destruction, or degradation of a cultural property, resource, or value to the point that it negatively affects the park's purpose and visitor experience.

In the absence of quantitative data concerning the full extent of actions under a proposed alternative, best professional judgement prevailed.

Impairment Analysis

In addition to determining the environmental consequences of the alternatives, National Park Service *Management Policies*, 2001, requires the analysis of potential effects to determine if actions would impair park resources. Under the National Park Service Organic Act and the General Authorities Act, as amended, the National Park Service may not allow the impairment of park resources and values except as authorized specifically by Congress. The National Park Service must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give the National Park Service management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment to the affected resources and values (*Management Policies* 1.4.3).

Impairment to park resources and values has been analyzed within this document. Impairment is an impact that, in the professional judgement of the responsible National Park Service manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the enabling legislation or proclamation of the park; is the key to the cultural or natural integrity of the park or to opportunities for enjoyment of the park; or as identified as a goal in the park's general management plan or other relevant National Park Service planning document. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

Cumulative Effects

Cumulative effects are the direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action (40 CFR Part 1508.7). Guidance for implementing NEPA (Public Law 91-190, 1970) requires that federal agencies identify the temporal and geographic boundaries within which they will evaluate potential cumulative effects of an action and the specific past, present, and reasonably foreseeable projects that will be analyzed. This includes potential actions within and outside the recreation area boundary. The geographical boundaries of analysis vary depending on the impact topic and potential effects. While this information may be inexact at this time, major sources of impacts have been assessed as accurately and completely as possible, using all available data.

Specific projects with the potential to cumulatively affect the resources (impact topics) evaluated for the project area are identified below. Some impact topics would be affected by several or all of the described activities, while others could be affected very little or not at all. How each alternative would incrementally contribute to potential impacts for a resource is included in the cumulative effects discussion for each impact topic.

Growth of Las Vegas Valley. The Las Vegas Valley was developed in conjunction with the railroads in the early 1900s. After that, the establishment of legalized gambling in 1910, construction of the Hoover Dam in 1935, and World War II continued to promote urban growth. During the 1930s, Las Vegas was a small railroad town with a population of just over 5,000. By 1960, Las Vegas' population was over 64,000 (Clark County's was 127,000), and by 1980 it was approximately 164,000 (Clark County's was 463,000). Starting in the mid-1980s, annual population increases averaging nearly seven percent caused Las Vegas' population to almost double between 1985 and 1995, increasing from about 186,000 to 368,000, a 97.6 percent increase. At the same time, Clark County's population increased from 562,000 to 1,036,000, an increase of 84.3 percent (Las Vegas City 2001a). The July 2000 population estimate for Las Vegas was 482,874 (Las Vegas City 2001b). The latest population prediction in the Las Vegas Valley is for two million people by 2005 (Las Vegas City 2001a).

Increases in Visitation. With the predicted increases in population in the local area, and continuing visitation from California and Arizona, park visitation will continue to increase above the current 8 to 10 million visitors per year.

Fluctuating Water Elevations of Lake Mead. On Lake Mead, the average daily elevation for the last 10 years (1992 through 2002) was 1,193.9 feet above mean sea level. The elevation of 1,221.4 feet above mean sea level represents the elevation at the top of the spillway gates. On July 24, 1983, a maximum water surface elevation of 1,225.85 feet above mean sea level was reached on Lake Mead. The theoretical minimum elevation required to generate power is 1,083 feet above mean sea level, and the minimum elevation required for the operation of the Southern Nevada Water Authority's original intake facility is 1,050 feet above mean sea level.

For the past 10 years (1992 through 2002) Lake Mead has operated between water surface elevations 1,173.39 and 1,215.89 feet above mean sea level. Lake Mead may increase or decrease its operating levels due to the adoption of Colorado River Interim Surplus Criteria by the Bureau of Reclamation and the above or below snow pack conditions. The Surplus Criteria will determine the surplus water conditions in the lower Colorado River Basin for the time period 2002 through 2016. The impacts on recreational resources from this action have been addressed in the *Colorado River Interim Surplus Criteria Final Environmental Impact Statement*, December 2000, document's prepared by Reclamation (BOR 2000).

Since 2000, Lake Mead's surface elevation has dropped 56 feet to 1158 feet above mean sea level. The Bureau of Reclamation has predicted that elevations will continue to drop to 1137 feet above mean sea level by June 2003. If this occurs, additional marina operations on Lake Mead could be forced to move out of their existing coves into alternative locations (BOR 2002).

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ALTERNATIVE A- NO ACTION

Soils and Vegetation

Under this alternative there would be no temporary relocation of the Las Vegas Bay Marina. It is predicted that in the near term (less than four months) the continued advancement of the Las Vegas Wash delta would cause the marina operators to remove their facilities prior to their complete inundation and entrapment by the delta. Such a planned removal of facilities would occur in previously disturbed areas, therefore, impacts would be negligible. Should a flash flood cause the delta to move rapidly and trap the marina prior to removal, it is likely that digging within soils below the high water line would be necessary to salvage and remove marina facilities.

Cumulative Effects: Actions necessary to remove the marina to protect it from the advance of the delta would occur in previously disturbed areas, and be of short duration. There would be no long-term, significant cumulative impacts on soils or vegetation from these activities.

Conclusion: No impairment to soils or vegetation would occur, due to the restriction of marina removal activities to previously disturbed areas, such as graded parking lots and areas below high water.

Wildlife and Aquatic Life

Marina operations would continue for a period of months, until such time as the advancement of the delta necessitates removal of marina facilities. There would be no increase in current levels of boating or other visitor activities in the area. Wildlife in the area of the marina generally consists of small mammals along the shoreline near the marina, shorebirds in the vicinity of the marina, fish that take cover or seek forage under the docks, and waterfowl. Continued operation of the marina until such time as the moving delta necessitates its removal would not alter current visitation or use of the area by park wildlife. Removal of the marina as the delta approaches would not alter wildlife use patterns. Removal of the marina would alter the habitat structure (cover, forage) that attracts wildlife to the marina; however, the species that use the marina are generalists and should readily adapt to abundant habitats nearby.

Cumulative Effects: The advancement of the delta in and of itself will alter the nature of the artificial habitats surrounding the marina that attract wildlife. The species that are attracted to the marina (seagulls, ducks, ravens, coyotes, carp, other fish) will readily adapt to changing conditions. Removal of the marina to prevent inundation and entrapment by the sediment will not alter in any way these species need to adjust to the changing conditions of the delta. Due to the readily available habitats and structure within the lake and shoreline, there would be no cumulative effects to wildlife from this alternative.

Conclusion: The continued advance of the delta and associated sediments would alter the nature of the habitats currently attracting wildlife to the marina location, whether or not the marina is removed. There would be no impact to wildlife as a result of this alternative. There is abundant habitat nearby for relocation. No impairment to wildlife would occur as a result of the impacts associated with this alternative.

Special Status Species

Only two special status species occur in the general vicinity of the marina. The most significant is the razorback sucker. Of two known spawning areas for the endangered razorback sucker, one is located on Blackbird point, across the channel from the marina. While direct impacts of marina operations has not been documented, there has been some concern that potential fuel spills associated with the marina pose some risk for this spawning area. Removal of the marina would lessen this risk.

The desert habitat in the immediate vicinity of the marina is not high quality desert tortoise habitat, although tortoises may occur occasionally. Lands associated with the direct operations of the marina have been routinely graded for decades, and are now currently far below the high water line of the lake. There is a very limited strip of Mojave desert scrub habitat between the graded marina facility area and the Lakeshore Road. Surveys over the past decade have found very few tortoises between the Lakeshore Road and the lake. Due to the almost exclusive restriction of marina removal activities to previously disturbed areas, it is not anticipated that this alternative would have an effect on the desert tortoise.

Cumulative Effects: The physical removal of the marina from its current location would have no cumulative effects on either the razorback sucker or the desert tortoise. The work would entail pulling docks and associated buildings on the docks out of the water onto beach areas below the high water line, and into areas which have been previously graded.

Conclusion: The no action alternative, with its necessary removal of docks and slips to prevent burial by sediment, would not effect sensitive species in the area. The impacts associated with this alternative would not impair sensitive species in the area.

Water Resources

Continued operation of the marina for an additional four to five months, until such time as is anticipated as necessary to remove the marina to prevent burial by sediments, would not add additional potential for water contamination beyond that which is currently occurring. The aquatic and water resources in the area would continue to receive the same potential exposure to fuel derivatives from boat operations as currently exist. Removal of the marina from its current location to prevent burial by sediments would reduce potential in the immediate inflow area of gasoline spills from boat fueling facilities.

Cumulative Effects: There is no cumulative effect of the no action alternative upon water resources. The no action alternative would necessitate the removal of the marina from its current location to prevent its burial by sediments.

Conclusion: There is no impairment of water resources due to the no action alternative. Removal of the existing facilities from the lake to prevent burial by sediment has no significant impacts to the local water quality.

Floodplains

Removal of the marina would have no effect on floodplains, wetlands, or related values.

Cumulative Effects: There are no cumulative effects to floodplains from removal of the existing facilities.

Conclusion: The removal of the existing facilities would not result in impairment of floodplain or wetland resources. There would be no placement of facilities in floodplain areas under this alternative.

Air Quality

Continued operation of marina in its existing location for an additional three to four months would not create additional effects upon air quality from that of current operations. The removal of the marina and slip facilities may increase fugitive dust locally and temporarily as facilities are pulled from the water and trucked out. Removal of the marina and slips would reduce emissions from carbureted boat engines in the local area. The local boat ramp is anticipated to remain open for launching .

Cumulative Effects: There is no cumulative effect from the removal of the marina facilities. Any dust created from pulling facilities out of the water should be local and temporary. Overall boat use in the Boulder Basin would be anticipated to remain the same.

Conclusion: There would be no impairment to air quality as a result of the impacts associated with the no action alternative.

Visual Resources

Continued operation of marina for a period of three to four months would not have an effect on visual resources. Removal of the marina to prevent burial by sediment would not significantly alter the visual scene within the remaining developed area.

Cumulative Effects: There is no cumulative effect of removing the marina upon the visual scene. The additional developed area and facilities (boat launching ramp, campground) would remain. Marinas are a traditional and appropriate scene within the recreation area.

While some may feel that they alter the natural setting, others may feel that they enhance the scene in appropriate settings.

Conclusion: There is no impairment to visual resources from removal of the marina.

Recreation Resources

The marina would be forced to close when the delta approaches. This would cause a significant impact to approximately 635 slip renters at the marina who would no longer have a place to slip their boat. The appropriate boating use levels recommended by the current *General Management Plan* and *Lake Management Plan* and draft *Environmental Impact Statement* would not be able to be met. Recreational boaters and the fishing public who trailer their boats in and launch on the ramp would no longer have access to fuel and appropriate sale items in the local area. Las Vegas Bay is a productive fishing area. Boaters and the fishing public at Las Vegas Bay would be effected by reduced facilities.

Cumulative Effects: There would be cumulative effects from the no action alternative. Removal of the marina, slips and associated facilities without replacement elsewhere in Boulder Basin would significantly reduce recreational boating access. The approximately 635 slips and boats associated with the current marina have been deemed as appropriate levels of use within the park's *Lake Management Plan* and draft *Environmental Impact Statement*, meeting the enabling legislation mandate for provision of boating and fishing in such a manner as preserves the scientific and resource values of the lakes. A significant proportion of the number of slips within the Boulder Basin, and potential boats on the water, could not be accommodated. Planning would be required to reallocate the slips associated with the current marina.

Conclusion: Removal of the existing marina without replacement of equal slips and boating accommodations would cause a temporary major adverse impact to recreation resources and the provision for the boating public as mandated by the park's enabling legislation and outlined in the *General Management Plan* and *Lake Management Plan*. Eventually, after a planning effort and facility expansion by other marinas, the slips would be restored at other locations on Lake Mead.

Visitor Experience and Public Safety

Boats and public property in the marina slips would need to be removed prior to burial by sediments from the delta. Until such time as the marina and associated property is removed, the public faces greater risks from loss of property to burial by sediment, including the potential of greater sediment transport rates during potential flood events in Las Vegas Wash. The visitor experience would be negatively affected by removal of the marina. Marinas are recreational attractions unto themselves, in addition to providing for the boating public. Although the National Park Service campground and launch ramp would remain, the visitor experience in those facilities would be degraded without the amenities currently provided by the marina. Existing slip renters would be displaced and

forced to relocate to another marina where there is no guarantee that slips are available. A possible reallocation of slips would occur after a planning effort. Once slips are constructed, recreational opportunities would increase. Congestion at other marinas in the Boulder Basin would increase. This could decrease the quality of the visitor experience and potentially increase the potential for public safety hazards.

Cumulative Effects: Cumulative effects related to public property and visitor safety would be minimal, as the possibility of burial in sediment from the delta would be removed with the removal of the marina. If a flood event occurs and buries the marina prior to the marina being removed, cumulative effects related to public property and visitor safety would be major, as property would be destroyed and visitor safety would be put at great risk. The negative effect on visitor experience would be cumulative under the no action alternative, as visitor opportunities for boating, sightseeing, visiting the marina, would be lost. Visitors to the remaining National Park Service campground and boat ramp would find fewer amenities and need to become more self-sufficient.

Conclusion: The no action alternative provides increased risk of property loss and a degree of threat to personal safety from the potential inundation by sediments from the delta. Once the marina and associated property is removed, those issues would be resolved. The loss of the marina facility, however, will cause long term major adverse impacts to the visitor experience to the Las Vegas Bay developed area in particular. It would cause temporary adverse impacts to recreational opportunities in the Boulder Basin until planning could be completed and the marina slips reallocated.

Socioeconomic Resources

Direct and Indirect Effects: The no action alternative creates significant socioeconomic impacts. Marina operation closure due to the advance of the delta would put out of business a family firm with over 45 years in the recreation area, \$4,000,000 in gross annual revenues and 50 employees. In addition, approximately 635 slip renters would need to find alternative sites, which may not be available on the lake until planning is completed, leading to higher boat storage and transport costs. Reduction in boating attributable to loss of the marina would lead to less spending for boating supplies and services from companies in the Las Vegas area. The NPS would also be required to compensate the marina operator for its loss of investment.

Cumulative Effects: The no action alternative would have a cumulative effect on socioeconomic resources, through the loss of jobs and the loss of a company with over 45 years of operation in the recreation area and \$4,000,000 in annual gross revenues, as well as impacts to local boating suppliers and service companies. Private boat owners may find it necessary to pay more for boat storage and transport.

Conclusion: The socioeconomic impact of the no action alternative is major, resulting in the termination of 45 years of marina experience in Lake Mead NRA, loss of \$4,000,000 in annual economic benefits, 50 jobs, costs to private boat owners, and loss of convenience to boat owners. In addition, the National Park Service would be required to

compensate the marina operator for the loss of investment. Larger boats may not be readily launched at existing ramps.

Recreation Area Operations

Should the marina become inundated by sediments, the recreation area and the marina operator would be involved in costly and staff consuming clean ups of debris, boats, equipment, and inventory. In addition, the National Park Service would be required to compensate the marina operator for the loss of investment. While it is the intention to remove the facility before that would happen under any of the alternatives, the longer the facility remains in place the greater the potential for inundation. Flood events in the Las Vegas Wash could cause the delta to advance rapidly. The recreation area would also be involved in coordinating with the marina operators for the removal of facilities as planned in the no action alternative.

Cumulative Effects: Cumulative effects upon recreation area operations would not be great in the no action alternative, provided that the marina is removed prior to arrival of the delta and inundation. Should the marina be buried rapidly, as result of a flood event in Las Vegas Wash, or acceleration in rate of water level drop in Lake Mead, the recreation area would be involved for many months in expensive and tedious clean-up of debris, including the potential for hazardous material removal or remediation.

Conclusion: The overall impact of the no action alternative to recreation area operations would be minor to moderate should the marina be removed prior to inundation. Should the area become buried by sediments prior to complete removal of facilities, boats and property, the recreation area would become involved in a costly clean-up process, which could create major impacts to the recreation area operations.

Cultural Resources

No new facility construction occurs under this alternative, only the removal from the water of existing facilities. No impacts to cultural resources would occur.

Cumulative Effects: There would be no cumulative impact to cultural resources through the removal of the marina.

Conclusion: This alternative does not result in impact or impairment to cultural resources.

**ALTERNATIVE B- Relocation of Marina Facilities to Horsepower Cove,
Management Preferred Alternative**

This alternative would require approximately 0.53 miles of graded road, 28 feet wide, and the grading of a 300-space parking lot. All of the impact areas would be below high water or on previously disturbed ground.

Soils and Vegetation

There is little vegetation present in this location of the Boulder Basin below the high water line. Mojave desert scrub habitat is located upslope of the high water line. Numerous roads and trails that relate to historic and current power transmission lines are present in this habitat. The footprint, other than the road and utilities, would be limited to areas below the high water line, thus there would be no effect on vegetation. Likewise, soils in the inundation zone of the lake, which have been through several flooding and dry cycles as the lake rises and falls, no longer maintain their integrity for sustaining native Mojave desert vegetation. The existing road would be utilized for the 0.53-mile graded road. Only slight disturbance would occur to Mojave desert ecosystem soils and vegetation above the high water line for the placement of utility poles associated with the electricity line, and the digging of a trench for the waterline. However, both would occur in previously disturbed areas, so negligible impacts are expected.

Cumulative Effects: Damage to vegetation and soils above the inundation zone would be negligible. Such disturbances would be on a localized basis and would not cause any long-term significant cumulative impacts on the dominant vegetation type or soils productivity within the recreation area.

Conclusion: Negligible impacts to soils and vegetation would occur on a localized basis, generally restricted to those segments of the 28-foot wide road graded above the high water line. However, all work would be within a previously disturbed corridor. Where feasible, topsoil would be removed prior to construction and replaced to assist with restoration of disturbed areas. Because of the small size of the impact area compared with the size of the resource base, and the predominant use of the already disturbed areas below the high water line, no impairment to the vegetation community and soils base would occur as a result of this alternative. There are no sensitive plant species within the area of this alternative.

Wildlife and Aquatic Life

As described in the Soils and Vegetation section, disturbances within undisturbed desert areas above the high water line would be minimal. This area is a part of the recreation area “development zone,” as classified within the *General Management Plan*. This area receives more than four million visitors annually.

The areas below high water have been degraded over time by alternative periods of flooding and drying, and most of the immediate shoreline area has long been used for intensive recreation. While common Mojave desert species may occupy the area, their densities are greatly reduced in these highly disturbed areas. Negligible impacts to wildlife would occur from the grading of a parking lot and road below the high water mark, or from utilizing existing disturbed road segments above high water. Much of this habitat is marginal, from years of high recreation use along the shoreline, and from powerline corridors above the high water line. Even so, it is possible that localized increased mortality would occur to lizards and small mammals from local increases in road traffic. The placement of a marina along the shoreline, however, would bring with it those generalist species (gulls, ravens, coyotes) which are attracted to, and adapt well to, human habitations. Likewise, the placement of a marina along the shoreline would attract local fish populations, especially creating a higher local density of carp than previously existed.

Cumulative Effects: Proposed facility construction would result in the disturbance or loss of marginal wildlife habitat. The irretrievable commitment of this acreage to development would preclude its further use as wildlife habitat. Localized increases in mortality of birds, small mammals and lizards may occur through increased attraction to the facility of species that interact well with human habitation, such as gulls, ravens and coyotes. Based on the available undisturbed habitat adjacent to or near construction sites, the long time history of high density recreation use in this area, and the small additional areas of undisturbed habitat, it would be unlikely that marina placement and associated road and parking would have significant cumulative impacts on wildlife habitat in the recreation area regionally.

Conclusion: Wildlife could be disturbed at construction sites during the construction periods, and marginal habitat would be removed. Increases in gulls, ravens and coyotes are possible, with increased mortality to birds, lizards and small mammals on the road corridor. However, populations of these species already are low due to the long-term history of shoreline recreation in the area. Based on the amount of undisturbed habitat adjacent to the proposed construction, the limited amounts of construction, and the long-term recreational impacts already in the area, this alternative would not impair park wildlife resources.

Special Status Species

There are no special status plant species in the area of alternative B. The razorback sucker is known to spawn in the vicinity of Blackbird Point, across the channel from the existing marina site. Thus, relocation of the marina as proposed by this alternative would move the marina approximately 15 water miles from the current location and its proximity to the razorback sucker spawning area. Such a move would likely reduce the potential for impacts to the razorback sucker by fuel spills and other potential hazards associated with marina operations. Since the spawning season occurs between December and April, the move would occur in October, and the known spawning area is currently

above the water line, there would be no effect to this species from the actual marina move.

The desert tortoise may occur in low densities above the high water line in the vicinity of this alternative. Surveys for construction of Lakeshore Road over the last ten years have found few individuals on the lakeside of the highway.

The peregrine falcon is known to nest in the area of Promontory Point, within two miles of the proposed marina location. Nesting, however, occurs on high cliffs well above the shoreline recreation. Boat traffic in high densities has long occurred along the base of Promontory Point on route to the entry to Black Canyon and a view of the Hoover Dam.

Cumulative Effects: The proposal would not result in effects to the razorback sucker. The move of the marina away from the spawning area of Blackbird Point should prove beneficial for the razorback sucker. There is no suitable habitat for the Southwestern willow flycatcher in the vicinity of the proposed marina. California brown pelican and Western snowy plover may occasionally migrate through the general location, but the area is not known to contain special habitat qualities for these species.

The desert tortoise may occur in low numbers in the general area above the high water line. Construction should follow standard mitigation procedures for prior tortoise survey and appropriate construction fencing and mitigation if necessary. There could be an impact to desert tortoise with the increase in traffic on Hemenway Road and Horsepower Cove Road. However, since these roads are located in low density tortoise habitat, this alternative would not likely adversely affect the desert tortoise.

Peregrine falcons in the cliffs of Promontory Point are well habituated to high densities of boat traffic.

Conclusion: There would be no effect to threatened, endangered or species of concern from impacts resulting from this alternative. There would be no impairment to these resources from the impacts associated with this alternative.

Water Resources

Components of the concession operations at any marina, especially those associated with fueling and boat maintenance, can create minor to moderate impacts on water quality within the marina area. Impacts can include the potential for fuel spills, potential for releases from sewage or gray water holding tanks, and higher concentrations of gasoline derivatives such as PAHs, benzene, and MTBE. Selected testing to date of selected high use areas, including marinas, have shown that while such compounds have been detected, they do not exceed state or Clean Water Act standards.

National Park Service provides guidance on best management practices for the handling of fueling areas and boat maintenance for concessioners and the boating public. Public

education and implementation of best management practices reduces the risk of spills. However, spills can still occur and create moderate to major impacts in the spill area. Marinas generally create localized and minor increases in nutrient loading due to their attraction of waterfowl, gulls and fish, as well as the provision of a substrate to grow algae.

Cumulative Effects: This proposal does not increase the cumulative impacts upon Boulder Basin from marina and boating operations. Essentially, the existing level of use at the current Las Vegas Bay marina location would be relocated to the proposed area. The result is no net increase in boating or fueling activity, but transfer of the focus of that activity from one location to another. Cumulative number of boats in basin and general distribution of boats would remain the same or similar.

Conclusion: Detectable, localized impacts on water quality would likely occur in the new marina location. Marinas by definition concentrate a certain level of boating use, and may have localized nutrient loading from gulls, ducks, and carp. However, existing marinas on Lake Mead and within the Boulder Basin have been proven to operate within state water quality standards and standards within the Clean Water Act. Detectable amounts of contaminants that may be found in the vicinity of marinas do not exceed standards, and are localized impacts. The relocation of marina operations would not result in impairment of water quality.

Floodplains

The proposed location would have no effect on floodplain or wetland values. The proposed area is not located within a flood zone (or does not provide for overnight use in a flood zone). The marina is functionally dependent upon being located in the water within the reservoir inundation zone.

Cumulative Effects: The proposed location will have no cumulative effects on floodplain or wetland values.

Conclusion: The proposal complies with executive orders for floodplain management and does not impair floodplain or wetland values.

Air Quality

Grading road and parking area would result in local and temporary fugitive dust. Newly graded roads would be treated with dust palliative to reduce dust emissions. Localized increases in hydrocarbon emissions would occur in direct area of marina and slips.

Cumulative Effects: Fugitive dust should be temporary, and mitigated by addition of dust palliative to road. Increases in hydrocarbon emissions would not have any net effect or cumulative effect, as the relocation of the marina from one area of Boulder Basin to another area and would not increase the number of boats in use.

Conclusion: There would be minor to moderate impacts to air quality as a result of increased dust in the project area, and with increased traffic in the new marina location. There would be no impairment to the air quality as a result of the impacts associated with this alternative.

Visual Resources

The marina would add a visual intrusion of commercial activity and infrastructure into an area where one does not currently exist. Marinas, however, are a traditional and appropriate part of the lake experience within the developed zones of the recreation area, and tens of thousands of visitors annually seek them out for sightseeing. Overhead power lines associated with the marina would be added to the area. However, the area currently has numerous powerlines, and one additional line would create negligible impacts to the visual resources.

Cumulative Effects: While the alternative would add a visual intrusion of commercial activity and infrastructure into a location without such facilities, the overall impact is not significant. Boulder Beach is a heavily developed area with marinas, hotels, fish hatchery and a water treatment facility visible from many areas. The net result is moving a facility essentially in kind from one location to another. Due to the net balance in facilities, and the existing infrastructure nearby, the alternative is not viewed as creating negative cumulative effects to the visual resources.

Conclusion: There would be minor impacts to the visual resources associated with placing a marina in an area that does not currently have any commercial activity. There would be no impairment to visual resources from the alternative.

Recreation Resources

Boulder Beach has a history of recognized use zones, which have been discussed in the *Lake Management Plan and draft Environmental Impact Statement*. This alternative places the marina in the Horsepower Cove area, a traditional personal watercraft area. Water skiers have long used the water surface area adjacent to the wall of Promontory Point. While none of these areas was zoned for exclusive use, the acknowledgement of these zones by traditional users have worked in general to separate activities and user conflicts. The placement of a marina in this location will have a negative effect on those who have traditionally used the Ski Beach and Horsepower Cove location. Additional crowding of boat traffic will occur, beach space will be lost to the facilities, and the surface area of the lake required for the marina facilities and associated wakeless harbor would result in a net loss of viable surface area for other activities.

While this is a negative impact, sufficient areas exist nearby for a continued quality recreation experience. Crowding of the area by other vessels would be mitigated in part by the wakeless harbor. Mitigation could include the marking of a harbor entry channel that guides general boating traffic entering and exiting the harbor away from available personal watercraft and water skiing areas.

Displaced boaters and slip renters, and other marina users who were displaced by removal of the marina due to the advance of the delta would be able to again use their boats and have necessary amenities within the Boulder Basin. The alternative area is approximately 15 miles from the original location, however, and some renters may choose not to relocate to this facility.

Cumulative Effects: There are no cumulative effects as they relate total boat use in Boulder Basin. Traditional users of the general area, familiar with the uses of Ski Beach and Horsepower Cove would need to adapt to the presence of the marina. Sufficient areas still exist for recreational use in the general vicinity, and sufficient area abounds in the entire Boulder Basin and other portions of Lake Mead.

Conclusion: There would be moderate impacts to those visitors who have used, or expect to utilize, the Horsepower Cove and Ski Beach areas for shoreline activities, such as personal watercraft use and swimming. These visitors would be displaced to elsewhere in the recreation area.

Visitor Experience and Public Safety

Visitors who have been used to the original location, and who slipped their boats there, would need to learn the use of another part of the lake. Some visitors may not relocate to the new location. However, these visitors would be better served as the threat associated with the marina being buried and property being destroyed would be removed. The general boating public would need to learn to navigate an additional wakeless harbor and adjust to localized increased boat traffic. Traditional users of the Horsepower Cove area would need to adjust their activities to avoid the marina and harbor area.

Cumulative Effects: There is a cumulative effect to the traditional users who would lose part of their traditional use areas to the marina, slips and facilities. However, there would still remain adequate space for a spectrum of recreation activities that recognizes the traditional uses in the area. Cumulative effects are not significant. There are adequate areas within Boulder Basin to accommodate the various user populations. There is no net change in number of boats in the basin.

Conclusion: This alternative would result in mixed impacts to visitor experience. Some visitors would experience beneficial results as they would be able to utilize the slips and marina facilities. Some visitors would experience minor to moderate negative impacts from the displacement from their recreational use area. Some visitors would not relocate to the marina in its new location, losing their opportunity to have a boat slipped at a marina facility. Public safety would improve as a result of implementing this alternative.

Socioeconomic Resources

This alternative would positively impact the marina operators as they would be able to resume operations. The marina at the original location grossed over \$4 million annually

and employed 50 people. The replacement of the slip capacity from the original marina would positively impact companies that supply and service boaters. In addition, a local family operated visitor service that has been in operation within Lake Mead NRA for 45 years would be sustained.

Cumulative Effects: There is a significant positive cumulative effect compared to the no action alternative. The marina operators would be able to resume their business, and there are spin off benefits for boat supply and service companies in Las Vegas from keeping the boats on the water.

Conclusion: The alternative has a favorable impact on socioeconomic resources.

Recreation Area Operations

The recreation area planning , resource and maintenance staff has been and would continue to be involved in planning and compliance review for this marina relocation. The recreation area and concessioner would coordinate the development of certain infrastructure, such as roads and utilities, to facilitate the move of the privately held marina facilities. However, the National Park Service would not be required to compensate the marina operator for the loss of its business.

Cumulative Effects: This environmental assessment only discusses the temporary moving of the marina until such time as long term planning can be completed. In addition, predictions for continued falling lake levels may necessitate the moving of additional marinas on Lake Mead. The recreation area is committed to completing a *General Management Plan* amendment in the near future that will discuss the permanent location for this marina, as well as potential needs to move other marinas should the lake levels continue to fall.

Conclusion: There would be a cost to the recreation area of providing the infrastructure and utility connections to facility the placement of the marina called for in this alternative. This could create moderate to major impacts to the recreation area operations due to personnel being committed to working on this project, and the funding to support the relocation of the facility. The recreation area, however, has management responsibilities to provide for the boating public and park visitors, as prescribed within the *General Management Plan* and the *Lake Management Plan and draft Environmental Impact Statement*. In addition, the costs incurred by the National Park Service would not be as significant as those incurred under the no action alternative, as the National Park Service would not be required to compensate the marina operator for loss of its business.

Cultural Resources

The land area associated in the immediate location of this site does not contain significant cultural resources. There are known locations of prehistoric and historic mining in the Mojave desert scrub habitat upslope from the shoreline location of the facilities. All roads into the site will be constructed well away from these known areas. Ground

disturbing impacts are generally below the high water line. The history of use in the recreation area would indicate that foot traffic would not increase significantly in desert areas away from the marina, as the visitors interest in those locations is towards the shore and water.

There are no significant submerged cultural resources offshore from this location.

Cumulative Effects: There are no cumulative cultural resource impacts from this alternative.

Conclusion: This alternative does not create an impairment of cultural resources.

ALTERNATIVE C- Relocation of Marina to Hemingway Point

This alternative would require approximately 0.27 miles of graded road, 28-feet wide and the grading of a 300-space parking lot. The areas of disturbance would be below high water and previously disturbed.

Soils and Vegetation

There is little vegetation present in this location of the Boulder Basin below the graded access road that parallels the lake at approximately the high water line. Nearly the entire foot print for the proposed facility, including the road, would be limited to areas below the high water line or previously disturbed areas, thus there would be no effect on vegetation. Likewise, soils in the inundation zone of the lake, which have been through several flooding and dry cycles as the lake rises and falls, no longer maintain their integrity for sustaining native Mojave desert vegetation. The 0.27-mile road which would be graded would utilize the existing road, and all of the road would be located below the high water line. Only slight disturbance would occur to Mojave desert ecosystem soils and vegetation above the high water line for the placement of utility poles associated with the electricity line, and the digging of a trench for the waterline. However, both would occur in previously disturbed areas, so negligible impacts are expected.

Cumulative Effects: Damage to vegetation and soils above the inundation zone would not occur under this alternative. There would be no cumulative impacts associated with implementing this alternative.

Conclusion: There would be a negligible effect to soils and vegetation as all development would occur below the high water line. Because of the small size of the impact area compared with the size of the resource base, and the use of the already disturbed areas below the high water line, no impairment to the vegetation community and soils base would occur. There are no sensitive plant species within the area of this alternative.

Wildlife and Aquatic Life

As described in the Soils and Vegetation section, disturbances within undisturbed desert areas above the high water line would not occur under this alternative. This area is a part of the Boulder Beach area classified as “development zone” within the General Management Plan. This area receives more than four million visitors annually. The areas below high water have been degraded over time by alternative periods of flooding and drying, and most of the immediate shoreline area has long been used for intensive recreation.

The area of the Hemenway and Fishing Point has for over a decade been used as a shoreline fishing access point, which is stocked with trout by Nevada Division of Wildlife in the fall through spring period. While common Mojave desert species may traverse or even occupy the area, their densities are greatly reduced in the previously disturbed areas. Limited impacts to wildlife would occur from the grading of a parking lot and road below the high water mark, or from utilizing existing disturbed road segments. Most areas to be graded have been graded in the past to accommodate shoreline access. Much of this habitat is marginal, from years of high recreation use along the shoreline, particularly near Fishing Point. Even so, it is possible that localized increased mortality would occur to lizards and small mammals from local increases in road traffic.

The placement of a marina along the shoreline would bring with it those generalist species (gulls, ravens, coyotes) which are attracted to, and adapt well to, human habitations. However, the long presence of shoreline recreation in this area has already resulted in some increases in those species. Likewise, the placement of a marina along the shoreline would attract local fish populations, especially creating a higher local density of carp than previously existed.

Cumulative Effects: Proposed facility construction would result in the disturbance or loss of marginal wildlife habitat. Localized increases in mortality of birds, small mammals and lizards may occur through increased attraction to the facility of species that interact well with human habitation, such as gulls, ravens and coyotes. However, those species are already present in above natural numbers due to the long history of shoreline recreation in the area. Based on the available undisturbed habitat adjacent to or near construction sites, the long time history of high density recreation use in this area, it would be unlikely that marina placement and associated road and parking would have significant cumulative impacts on wildlife habitat in the recreation area regionally.

Conclusion: Wildlife could be disturbed at construction sites during the construction periods, and marginal habitat would be removed, creating a negligible adverse impact. Increases in gulls, ravens and coyotes are possible, with increased mortality to birds, lizards and small mammals. Based on the amount of undisturbed habitat adjacent to the proposed construction, the limited amounts of construction, and the long-term recreational impacts already in the area, this alternative is not viewed to impair park wildlife resources.

Special Status Species

There are no special status plant species in the area of alternative C. As described in alternative B, the razorback sucker is known to spawn in the vicinity of Blackbird Point, across the channel from the existing marina site. Thus, relocation of the marina as proposed by this alternative would move the marina some 15 miles from the current location and its proximity to the razorback sucker spawning area. Such a move would likely reduce the potential for impacts to the razorback sucker by fuel spills and other potential hazards associated with marina operations. The Hemenway Point area does not contain suitable sites for razorback sucker spawning.

The desert tortoise may occur in low densities above the high water line in the vicinity of this alternative. Surveys for construction of Lakeshore Road over the last ten years have found few individuals on the lakeside of the highway.

Cumulative Effects: The proposal would not result in effects to the razorback sucker. The move of the marina away from the spawning area of Blackbird Point should prove beneficial for the razorback sucker. There is no suitable habitat for the Southwestern willow flycatcher in the vicinity of the proposed marina. California brown pelican and Western snowy plover may occasionally migrate through the general location, but the area is not known to contain special habitat qualities for these species.

The desert tortoise may occur in low numbers in the general area above the high water line. No construction would occur above high water line. There could be an impact to desert tortoise with the increase in traffic on the Hemenway Harbor road and the shoreline access Road. However, since these roads are located in low density and low quality desert tortoise habitat, this alternative would not likely adversely affect the desert tortoise.

Conclusion: There would be no effect to a slightly beneficial effect to threatened, endangered or species of concern from impacts resulting from this alternative. There would be no impairment to sensitive or listed species as a result of implementing this alternative.

Water Resources

As described in alternative B, components of the concession operations at any marina, especially those associated with fueling and boat maintenance, can create minor to moderate impacts on water quality within the marina area. Impacts can include the potential for fuel spills, potential for releases from sewage or gray water holding tanks, and higher concentrations of gasoline derivatives such as PAHs, benzene, and MTBE. Selected testing to date of selected high use areas, including marinas, have shown that while such compounds have been detected, they do not exceed state or Clean Water Act standards.

National Park Service provides guidance on best management practices for the handling of fueling areas and boat maintenance for concessioners and the boating public. Public education and implementation of best management practices reduces the risk of spills. However, spills can still occur and create moderate to major impacts in the spill area. Marinas generally create localized and minor increases in nutrient loading, due to their attraction of ducks, gulls and fish, and their provision of substrate for algae growth.

Cumulative Effects: This proposal does not increase the cumulative impacts upon Boulder Basin from marina and boating operations. Essentially, the existing level of use at the current Las Vegas Bay marina location would be relocated to the proposed area. The result is no net increase in boating or fueling activity, but transfer of the focus of that activity from one location to another. In general, water circulation within the area of this alternative is better than that at the existing location under the low water conditions. Cumulative number of boats in basin and general distribution of boats would remain the same or similar.

Conclusion: Detectable, localized impacts on water quality would likely occur in the new marina location. Marinas by definition concentrate a certain level of boating use, and may have localized nutrient loading from gulls, ducks, and carp. However, existing marinas on Lake Mead and within the Boulder Basin have been proven to operate within state water quality standards and standards within the Clean Water Act. Detectable amounts of contaminants that may be found in the vicinity of marinas do not exceed standards, and are localized impacts. Under normal operations, there are expected to be minor to moderate adverse effects to the water resources. The relocation of marina operations would not result in impairment of water quality.

Floodplains

The proposed location would have no effect on floodplain or wetland values. The proposed area is not located within a flood zone (or does not provide for overnight use in a flood zone). The marina is functionally dependent upon being located in the water within the reservoir inundation zone.

Cumulative Effects: The proposed location will have no cumulative effect on floodplain or wetland values.

Conclusion: The proposal complies with executive orders for floodplain management and does not impair floodplain or wetland values.

Air Quality

Grading road and parking area would result in local and temporary fugitive dust. Newly graded road would be treated with dust palliative to reduce dust emissions. Localized increases in hydrocarbon emissions will occur in direct area of marina and slips.

Cumulative Effects: Fugitive dust should be temporary, and mitigated by addition of dust palliative to road. Increases in hydrocarbon emissions would not have any net effect or cumulative effect, as the relocation of the marina from one area of Boulder Basin to another will not increase the number of boats in use.

Conclusion: There would be minor to moderate impacts to air quality as a result of the construction activities, and increased use of the road and parking lots. There would not be an impairment to air quality due to the impacts associated with this alternative.

Visual Resources

The marina would add a visual intrusion of commercial activity and infrastructure into an area where one does not currently exist. Marinas, however, are a traditional and appropriate part of the lake experience within the developed zones of the recreation area, and tens of thousands of park visitors seek them out for sightseeing. Overhead power lines associated with the marina would be added to the area. However, the area currently has numerous powerlines, and one additional line would create negligible impacts to the visual resources.

Cumulative Effects: While the alternative would add a visual intrusion of commercial activity and infrastructure into a location without such facilities, the overall impact is not significant. Boulder Beach is a heavily developed area with marinas, hotels, fish hatchery and a water treatment facility visible from many areas. The net result of moving a facility essentially in kind from one location to another is negligible to minor. Due to the net balance in facilities, and the existing infrastructure nearby, the alternative is not viewed as creating negative cumulative effects to the visual resources.

Conclusion: Effects to the visual resource are negligible to minor. There is no impairment to visual resources from the alternative.

Recreation Resources

The Fishing Point area is very popular with shoreline anglers, with thousands of angler-use-days annually. For over a decade, Nevada Division of Wildlife has used that location for stocking trout in the fall through spring period. There generally is a wheelchair-accessible fishing dock at Fishing Point, though with current water levels this area is currently inaccessible. The marina will displace shoreline users of this area. The displacement of available shoreline may be mitigated, however, somewhat by the presence of the marina and dock facilities, which can become fish attractors. All of the marinas on Lake Mead have popular shoreline fishing areas just outside the posted closed to fishing harbor. The National Park Service would relocate the accessible fishing area outside the marina location.

Displaced boaters and slip renters, and other marina users who were displaced by removal of the marina due to the advance of the delta will be able to again use their boats and have necessary amenities within the Boulder Basin. The alternative area is

approximately 10 miles from the original location, and some renters may choose not to travel the extra distance.

Cumulative Effects: Should shoreline angling in the area be totally displaced, that would constitute a negative cumulative effect. While there are other areas on the lake for shoreline fishing, quality shoreline fishing requires access, appropriate bottom slopes, and below lake habitat structure. A total loss of this area to shoreline fishing would likely not be made up entirely satisfactorily elsewhere. However, shoreline fishing and marinas have traditionally co-existed very well. The displacement of a certain area of shoreline access may well be mitigated by the presence of the docks and marina facilities to attract fish.

There are no cumulative effects as they relate to total boat use in Boulder Basin.

Conclusion: There are moderate to major impacts to recreation uses, particularly fishing and accessible fishing, from this alternative. This impact can be mitigated with the relocation of shoreline fishing areas, and accessible areas, in the vicinity of the marina.

Visitor Experience and Public Safety

Visitors who have been used to the marina original location, and who slipped their boats there, would need to learn the use of another part of the lake. Some visitors may not feel like driving the additional 10 miles to use the new facility. However, these visitors would be better served as the threat of the marina being buried and property being destroyed would be removed. The general boating public would need to learn to navigate an additional area of wakeless harbor and adjust to localized increased boat traffic. Traditional users of the Fishing Point area, particularly shoreline anglers would need to adjust their activities to avoid the marina and harbor area.

Hemingway Harbor boat ramp is an extremely popular location for launching boats. There has not been a marina facility there in recent times. All nine of the marinas within the recreation area, however, have a long history of associated boat ramps. While traditional users of Hemingway Harbor would need to get used to more crowding in the harbor and approaches, long experience at the nine marinas would indicate that would be possible.

A number of paddlecraft visitors, primarily kayaks, now launch at Hemingway Harbor. While they are certainly used to boat traffic from the ramp, they would have to alter their routes to Boulder Islands and other destinations to avoid the increased traffic of the marina harbor.

Cumulative Effects: Cumulative effects are not significant. There are adequate areas within Boulder Basin to accommodate the various user populations. There is not net change in number of boats in the basin. Traditional users of Hemingway Harbor would need to adjust their use to the increased local congestion. Safety issues of the congestion are offset through the enforced wakeless speeds that exist within all harbor areas.

Conclusion: Congestion in the Hemingway Harbor would increase and could create moderate to major impacts to the recreational user in that area. This is based largely on the posting and enforcement of the wakeless harbor area. Safety would not be impacted under this alternative. An educational and adjustment period would be necessary for traditional users of the area. Design would need to establish parking areas and other means to separate shoreline anglers from the general traffic.

Socioeconomic Resources

This alternative would benefit the marina operators to resume operations as they would be able to resume operations. The marina at the original location grossed over \$4 million annually and employed 50 people. The replacement of the slip capacity from the original marina would positively impact companies that supply and service boaters. In addition, a local family operated visitor service that has been in operation within Lake Mead NRA for 45 years would be sustained.

Should shoreline fishing be entirely displaced, there could be economic loss to firms in the Las Vegas area that supply and service the angling public. However, as stated above, marinas and shoreline fishing in the vicinity outside the closed harbor has proven compatible.

Cumulative Effects: There is a significant positive cumulative effect compared to the no action alternative. The marina operators would be able to resume their business, and there are spin-off benefits for boat supply and service companies in Las Vegas from keeping the boats on the water.

Conclusion: The alternative has a favorable impact on socioeconomic resources.

Recreation Area Operations

The recreation area planning, resource and maintenance staff has been and would continue to be involved in planning and compliance review for this marina relocation. This could create moderate to major impacts to the recreation area operations due to personnel being committed to working on this project, and the funding to support the relocation of the facility. The recreation area and concessioner would coordinate the development of certain infrastructure, such as roads and utilities, to facilitate the move of the privately held marina facilities. However, the NPS would not be required to compensate the marina operator for the loss of its business.

Cumulative Effects: This environmental assessment only discusses the temporary moving of the marina until such time as long term planning can be completed. In addition, predictions for continued falling lake levels may necessitate the moving of additional marinas on Lake Mead. The recreation area is committed to completing a general management plan amendment in the near future that will discuss the permanent location for this marina, as well as potential needs to move other marinas should the lake levels continue to fall.

Conclusion: There would be a cost to the recreation area of providing the infrastructure and utility connections to facility the placement of the marina called for in this alternative. The recreation area, however, has management responsibilities to provide for the boating public and park visitors, as prescribed within the *General Management Plan* and the *Lake Management Plan and draft Environmental Impact Statement*. In addition, the costs incurred by the NPS would not be as significant as those incurred under the no action alternative, as the NPS would not be required to compensate the marina operator for loss of its business.

Cultural Resources

The site for this alternative does not contain significant cultural resources. Ground disturbing impacts are below the high water line.

There are significant submerged cultural resources approximately 1 mile offshore from this location. Concrete batch plants associated with the building of Hoover Dam are known to be located near the Boulder Islands, approximately 0.8 mile offshore. The locations of these batch plants are well known and the batch plants are the frequent destination of recreation SCUBA divers. The general area of the batch plants receives high volumes of boat traffic and density. The site would be developed to avoid close connection to the batch plants. Floating docks and slips floating on the surface would pose no greater threat to the batch plants than the long established recreation boating. Should the lake levels continue to drop to such an extent that the batch plant is located in less than 30 feet of water, any necessary movement of the marina to adjust to water levels would be constituted to avoid the batch plant area. At those water levels the park would coordinate with the Nevada State Historic Preservation Office to determine if any protective measures related to general recreation are needed.

Cumulative Effects: There are no cumulative cultural resource impacts from this alternative.

Conclusion: This alternative does not create an impairment of cultural resources.

ALTERNATIVE D, Government Buy-out of Marina Operations

Soils and Vegetation

Under this alternative there would be no temporary relocation of the Las Vegas Bay Marina. Removal of facilities would occur in previously disturbed areas, therefore, impacts would be minor. Should a flash flood cause the delta to move rapidly and trap the marina prior to removal, it is likely that digging within soils below the high water line would be necessary to salvage and remove marina facilities.

Cumulative Effects: Actions necessary to remove the marina would occur in previously disturbed areas, and be of short duration. There would be no long-term, significant cumulative impacts on soils or vegetation from these activities.

Conclusion: There would be no impacts to soils and vegetation under this alternative. No impairment to soils or vegetation would occur, due to the restriction of marina removal activities to previously disturbed areas, such as graded parking lots and areas below high water.

Wildlife and Aquatic Life

With removal of the marina facilities, there would be no increase in current levels of boating or other visitor activities in the area and there is potential for a decrease in current levels of boating and other visitor activities in the area. Wildlife in the area of the marina generally consists of small mammals along the shoreline near the marina, shorebirds in the vicinity of the marina, fish that take cover or seek forage under the docks, and waterfowl. Removal of the marina facilities would not alter current visitation or use of the area by park wildlife, nor would it alter wildlife use patterns. Removal of the marina would alter the habitat structure (cover, forage) that attracts wildlife to the marina; however, the species that use the marina are generalists and should readily adapt to abundant habitats nearby.

Cumulative Effects: The advancement of the delta in and of itself will alter the nature of the artificial habitats surrounding the marina that attract wildlife. The species that are attracted to the marina (seagulls, ducks, ravens, coyotes, carp, other fish) will readily adapt to changing conditions. Removal of the marina will not alter in any way the species need to adjust to the changing conditions of the delta. Due to the readily available habitats and structure within the lake and shoreline, there would be no cumulative effects to wildlife from this alternative.

Conclusion: The continued advance of the delta and associated sediments would alter the nature of the habitats currently attracting wildlife to the marina location, whether or not the marina is removed. There is abundant habitat nearby for relocation. No impairment to wildlife would occur as a result of the impacts associated with this alternative.

Special Status Species

Only two special status species occur in the general vicinity of the marina. The most significant is the razorback sucker. Of two known spawning areas for the endangered razorback sucker in Lake Mead, one is located on Blackbird point, across the channel from the marina. While direct impacts of marina operations has not been documented, there has been some concern that potential fuel spills associated with the marina pose some risk for this spawning area. Removal of the marina would lessen this risk.

The desert habitat in the immediate vicinity of the marina is not high quality desert tortoise habitat, although tortoises may occur occasionally. Lands associated with the direct operations of the marina have been routinely graded for decades, and are now currently far below the high water line of the lake. There is a very limited strip of Mojave desert scrub habitat between the graded marina facility area and the Lakeshore Road. Surveys over the past decade have found very few tortoises between the Lakeshore Road and the lake. Due to the almost exclusive restriction of marina removal

activities to previously disturbed areas, it is not anticipated that this alternative would have an effect on the desert tortoise.

Cumulative Effects: The physical removal of the marina from its current location would have no cumulative effects on either the razorback sucker or the desert tortoise. The work would entail pulling docks and associated buildings on the docks out of the water onto beach areas below the high water line, and into areas which have been previously graded.

Conclusion: This alternative, with the removal of all marina facilities, would not effect sensitive species in the area. The impacts associated with this alternative would not impair sensitive species in the area.

Water Resources

Removal of the marina would not add additional potential for water contamination beyond that which is currently occurring. The aquatic and water resources in the area would continue to receive the same potential exposure to fuel derivatives from boat operations as currently exist. Removal of the marina from its would reduce potential in the immediate inflow area of gasoline spills from boat fueling facilities.

Cumulative Effects: There is no cumulative effect of this alternative upon water resources.

Conclusion: There is no impairment of water resources from this alternative. Removal of the existing facilities from the lake has no significant impacts to the local water quality.

Floodplains

Removal of the marina would have no effect on floodplains, wetlands, or related values.

Cumulative Effects: There are no cumulative effects to floodplains from removal of the existing facilities.

Conclusion: The removal of the existing facilities would not result in impairment of floodplain or wetland resources. There would be no placement of facilities in floodplain areas under this alternative.

Air Quality

Removal of the marina facilities would not create additional effects upon air quality from that of current operations. The removal of the marina and slip facilities may increase fugitive dust locally and temporarily as facilities are pulled from the water and removed from the recreation area. Removal of the marina and slips would reduce emissions from carbureted boat engines in the local area. The local boat ramp is anticipated to remain open for launching .

Cumulative Effects: There is no cumulative effect from the removal of the marina facilities. Any dust created from pulling facilities out of the water should be local and temporary.

Conclusion: Only short-term, temporary, negligible impacts would occur to air quality as a result of removing the marina. There would be no impairment to air quality as a result of the impacts associated with this alternative.

Visual Resources

Removal of the marina would not significantly alter the visual scene within the remaining developed area.

Cumulative Effects: There is no cumulative effect of removing the marina upon the visual scene. The additional developed area and facilities (boat launching ramp, campground) would remain. Marinas are a traditional and appropriate scene within the recreation area. While some may feel that they alter the natural setting, others may feel that they enhance the scene in appropriate settings.

Conclusion: There is no impairment to visual resources from removal of the marina.

Recreation Resources

Closure of the marina would result in the displacement of 635 slip renters at Las Vegas Bay who would no longer have a place to slip their boat. The appropriate boating use levels recommended by the current *General Management Plan* and *Lake Management Plan* and draft *Environmental Impact Statement* would not be able to be met until reallocation was completed and facilities expanded. Recreational boaters and the fishing public who trailer their boats in and launch on the ramp would no longer have access to fuel and appropriate sale items in the local area. Boaters and the fishing public at Las Vegas Bay would be impacted by reduced facilities.

Cumulative Effects: Removal of the marina, slips and associated facilities without replacement elsewhere in Boulder Basin would significantly reduce recreational boating access temporarily. The approximately 635 slips and boats associated with the current marina have been deemed as appropriate levels of use within the park's *Lake Management Plan* and draft *Environmental Impact Statement*, meeting the enabling legislation mandate for provision of boating and fishing in such a manner as preserves the scientific and resource values of the lakes. A significant proportion of the number of slips within the Boulder Basin, and potential boats on the water, could not be accommodated. Other marina facilities in the Boulder Basin may be over-burdened and beyond design capacities in attempts to accommodate the transplanted boaters.

Conclusion: Removal of the existing marina would cause significant, temporary impacts to recreation resources and the provision for the boating public as mandated by the park's enabling legislation and outlined in the *General Management Plan* and *Lake Management Plan*, until slips could be reallocated and facilities upgraded.

Visitor Experience and Public Safety

The visitor experience would be negatively affected by removal of the marina. Marinas are recreational attractions unto themselves, in addition to providing for the boating public. Although the NPS campground and launch ramp would remain, the visitor experience in those facilities would be degraded without the amenities currently provided by the marina. Existing slip renters would be displaced and forced to relocate to another marina where there is no guarantee that slips are available. Congestion at other marinas in the Boulder Basin could increase with the reallocation of the slips, increasing the demand on facilities. Congestion could decrease the quality of the visitor experience, and possibly increase the potential for public safety hazards.

Cumulative Effects: Cumulative effects related to public property and visitor safety would be minimal, as the possibility of burial in sediment from the delta would be removed with the removal of the marina. If a flood event occurs and buries the marina prior to the marina being removed, cumulative effects related to public property and visitor safety would be major, as property would be destroyed and visitor safety would be put at great risk. The negative effect on visitor experience would be cumulative under this alternative, as visitor opportunities for boating, sightseeing, visiting the marina, would be lost. Visitors to the remaining NPS campground and boat ramp would find fewer amenities and need to become more self-sufficient. Overall boating use in the Boulder Basin would not increase, however, congestion and facility demand would increase at other marina facilities located in the Boulder Basin.

Conclusion: The loss of the marina facility would cause long term impacts to the visitor experience in Boulder Basin in general, and the Las Vegas Bay developed area in particular.

Socioeconomic Resources

This alternative creates moderate to major adverse socioeconomic impacts. Marina operation closure would put out of business a family firm with over 45 years in the recreation area, \$4,000,000 in gross annual revenues, and 50 employees. In addition, approximately 635 slip renters would need to find alternative sites, which may not be available on the lake until planning for potential slip reallocation is completed, leading to temporary higher boat storage and transport costs. Reduction in boating attributable to loss of the marina would lead to less spending for boating supplies and services from companies in the Las Vegas area. The National Park Service would be required to compensate the marina operator for its loss of investment.

Cumulative Effects: This alternative would have a cumulative effect on socioeconomic resources, through the loss of jobs and the loss of a company with over 45 years in the recreation area and \$4,000,000 in annual gross revenues, as well as impacts to local boating suppliers and service companies. Private boat owners may find it necessary to pay more for boat storage and transport.

Conclusion: The socioeconomic impact of this alternative is significant, resulting in the termination of 45 years of marina experience in Lake Mead NRA, the loss of \$4,000,000 in annual economic benefits, 50 jobs, costs to private boat owners, and loss of convenience to boat owners. In addition, the NPS would be required to compensate the marina operator for loss of investment. Larger boats also may be displaced and even unable to launch at existing ramps.

Recreation Area Operations

The National Park Service would be required to compensate the marina operator for loss of investment. The recreation area would be involved in coordinating with the marina operators for the removal of facilities as planned in this alternative. However, should the marina become inundated by sediments prior to removal, the recreation area and the marina operator would be involved in costly and staff consuming clean ups of debris, boats, equipment, and inventory.

Cumulative Effects: Cumulative effects upon recreation area operations would not be great in this alternative, provided that the marina is removed prior to arrival of the delta and inundation. Should the marina be buried rapidly, as result of a flood event in Las Vegas Wash, or acceleration in rate of water level drop in Lake Mead, the recreation area would be involved for many months in expensive and tedious clean-up of debris, including the potential for hazardous material removal or remediation.

Conclusion: The overall impact of this alternative to recreation area operations would not be significant should the marina be removed prior to inundation. The National Park Service would be required to compensate the marina operator for loss of investment. Should the area be buried by sediments prior to complete removal of facilities, boats and property, the recreation area would become involved in a costly clean-up process.

Cultural Resources

No new facility construction occurs under this alternative, only the removal from the water of existing facilities. No impacts to cultural resources would occur.

Cumulative Effects: There would be no cumulative impact to cultural resources through the removal of the marina.

Conclusion: This alternative does not result in impact or impairment to cultural resources.

SECTION V: COORDINATION AND CONSULTATION

Internal scoping occurred with park staff and concessioner representatives in July. A meeting of area scientists, and local, state, and federal agencies occurred July 18 to discuss issues related to the expanding delta at Las Vegas Bay.

Public scoping took place between August 5 and September 6, 2002, to generate issues and alternatives related to the proposed plan. A scoping press release was distributed, and a scoping newsletter was sent to interested agencies, organizations, and other interested parties. In addition, a scoping notification was published on the park's web page. The park received 31 written responses expressing support for the relocation of the marina operations.

Public notice of the availability of this environmental assessment was published in local newspapers, and on the Lake Mead NRA Internet Web site (<http://www.nps.gov/lame>). Individuals and organizations could request the environmental assessment in writing or by phone. The environmental assessment was circulated to various federal, state, and local agencies, individuals, businesses, and organizations on the park's mailing list for a 15-day public review period. Copies of the environmental assessment were made available at area libraries.

A copy of the environmental assessment can be obtained by direct request to:

Resource Management Division, Compliance Branch
National Park Service
Lake Mead National Recreation Area
601 Nevada Highway
Boulder City, Nevada 89005
Telephone: (702) 293-8956
Facsimile: (702) 293-8008

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APPENDIX A
ENDANGERED, THREATENED, AND CANDIDATE SPECIES OF NEVADA
(Updated April 4, 2000)

| Species | Federal Status | Critical Habitat in Nevada | Recovery Plan |
|--|----------------|----------------------------|---------------|
| Birds | | | |
| Mountain plover, <i>Charadrius montanus</i> ^a | PT | N | N |
| Southwestern willow flycatcher, <i>Empidonax traillii extimus</i> | E | N | N |
| Bald eagle, <i>Haliaeetus leucocephalus</i> ^b | T | N | Y |
| Yuma clapper rail, <i>Rallus longirostris yumanensis</i> | E | N | Y |
| Reptile | | | |
| Desert tortoise, <i>Gopherus agassizii</i> | T | Y | Y |
| Amphibian | | | |
| Columbia spotted frog, <i>Rana luteiventris</i> (Great Basin pop.) | C | N/A | N/A |
| Fishes | | | |
| Warner sucker, <i>Catostomus warnerensis</i> | T | N | Y |
| Cui-ui, <i>Chasmistes cujus</i> | E | N | Y |
| White River springfish, <i>Crenichthys baileyi baileyi</i> | E | Y | Y |
| Hiko White River springfish, <i>Crenichthys baileyi grandis</i> | E | Y | Y |
| Railroad Valley springfish, <i>Crenichthys nevadae</i> | T | Y | Y |
| Devils Hole pupfish, <i>Cyprinodon diabolis</i> | E | N | Y |
| Ash Meadows Amargosa pupfish, <i>C. nevadensis mionectes</i> | E | Y | Y |
| Warm Springs pupfish, <i>Cyprinodon nevadensis pectoralis</i> | E | N | Y |
| Pahrump poolfish, <i>Empetrichthys latos</i> | E | N | Y |
| Desert dace, <i>Eremichthys acros</i> | T | Y | Y |
| Humpback chub, <i>Gila cypha</i> ^c | E | N | Y |
| Bonytail chub, <i>Gila elegans</i> | E | Y | Y |
| Pahranagat roundtail chub, <i>Gila robusta jordani</i> | E | N | Y |
| Virgin River chub, <i>Gila seminuda</i> ^d | E | Y | Y |
| White River spinedace, <i>Lepidomeda albivallis</i> | E | Y | Y |
| Big Spring spinedace, <i>Lepidomeda mollispinis pratensis</i> | T | Y | Y |
| Moapa dace, <i>Moapa coriacea</i> | E | N | Y |
| Lahontan cutthroat trout, <i>Oncorhynchus clarki henshawi</i> | T | N | Y |
| Woundfin, <i>Plagopterus argentissimus</i> | E | Y | Y |
| Colorado pikeminnow, <i>Ptychocheilus lucius</i> ^c | E | N | Y |
| Independence Valley speckled dace, <i>Rhinichthys osculus lethoporus</i> | E | N | Y |
| Ash Meadows speckled dace, <i>R. osculus nevadensis</i> | E | Y | Y |
| Clover Valley speckled dace, <i>R. osculus oligoporus</i> | E | N | Y |
| Bull trout, <i>Salvelinus confluentus</i> | T | N | N |

| Species | Federal Status | Critical Habitat in Nevada | Recovery Plan |
|---|----------------|----------------------------|---------------|
| Razorback sucker, <i>Xyrauchen texanus</i> | E | Y | Y |
| Invertebrates | | | |
| Ash Meadows naucorid, <i>Ambrysus amargosus</i> | T | Y | Y |
| Carson wandering skipper, <i>Pseudocopaedodes eunus obscurus</i> | C | N/A | N/A |
| Plants | | | |
| Ash Meadows milkvetch, <i>Astragalus phoenix</i> | T | Y | Y |
| Spring-loving centaury, <i>Centaureum namophilum</i> | T | Y | Y |
| Ash Meadows sunray, <i>Enceliopsis nudicaulis</i> var. <i>corrugata</i> | T | Y | Y |
| Steamboat buckwheat, <i>Eriogonum ovalifolium</i> var. <i>williamsiae</i> | E | N | Y |
| Ash Meadows gumplant, <i>Grindelia fraxino-pratensis</i> | T | Y | Y |
| Ash Meadows ivesia, <i>Ivesia eremica</i> (= <i>I. kingii</i> var. <i>eremica</i>) | T | Y | Y |
| Ash Meadows blazing star, <i>Mentzelia leucophylla</i> | T | Y | Y |
| Amargosa niterwort, <i>Nitrophila mohavensis</i> | E | N | Y |
| Blue Diamond cholla, <i>Opuntia whipplei</i> var. <i>multigeniculata</i> | C | N/A | N/A |
| Tahoe yellow cress, <i>Rorippa subumbellata</i> | C | N/A | N/A |
| Ute lady's tresses, <i>Spiranthes diluvialis</i> | T | N | D |

E = Endangered; T = Threatened; PT = Proposed Threatened; C=Candidate.

a. Uncommon transient in Nevada.

b. Proposed for delisting.

c. Believed to be extirpated from Nevada.

d. Endangered only in the Virgin River; population in Muddy River is species of concern.